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The PHOTOFACT Servicer

AUG. 15, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 5, No. 43

ROBERT M. ELLIS, *Editor*

HERE'S YOUR VERY OWN "RED BOOK"

An amazing new PHOTOFACT publication—"The Radio Industry RED BOOK" is your Replacement Parts Buyers Guide. It provides accurate replacement parts listings for all nine major components—the products of 17 leading parts makers, whose names like "Sterling" on silver, are acknowledged designations of quality. In one easy-to-use volume, all popular sets made in the ten-year period from 1938 to 1948, are covered. The RED BOOK is expensively Smythe-sewed, it lies F-L-A-T on your work-bench. It's easy to use, accurate, and a wonderful time-saver.

The enclosed announcement provides details. The RED BOOK is essential—an absolute *must* for your business. Place your order for your copy today!

KEEPING IT SIMPLE

One of the things we think you will like about the PHOTOFACT Television Course is its simplicity of language. This simplicity is not accidental, but is rather the result of a deliberate policy. We want to give you practical information that you can absorb with the least effort and in the minimum amount of time.

One of the pitfalls of the technical writer covering a complicated subject like television is the temptation to use odd or unusual words. The new student of any subject usually has a big enough task on his hands to master the subject itself, without having the subject cloaked in a new terminology, however well that terminology may fit. Regrettably, there are a number of words not in common use which must be employed for the proper statement of television phenomenon—such words as raster, synchronism, resolution, etc. However, we are trying to keep the number of such words at an absolute minimum.

We are using a book called the "Thorndike Century Senior Dictionary" in editing the television lessons. In addition to giving definitions, the Thorndike Dictionary grades words according to their popularity and commonness of use. Television is a subject which should be comprehensible in the normal language of a high school student; and we are doing our best to keep it that way.

Did you ever notice that when a man really knows his subject he can describe it in plain, simple language; whereas a less informed individual must take refuge in obscure and complicated words? In this lies the charm and force of Al Saunders' lectures. In transferring these to printed form, we are striving to maintain the same clarity and ease of understanding.

We will welcome at any time your comments on how we can better achieve this end.

★ ★

TELEVISION QUESTION AND ANSWER FORUM

The study of the PHOTOFACT Television Course may bring to your mind questions and comments on the theory or practice of television. We want these questions because they will help us to tailor the television course to your requirements.

Questions of general interest on subjects covered by preceding lessons will be answered in these columns. Read the "Forum" regularly. It is probable that the answers to typical questions will answer many special questions of your own.

★

AQUADAG

QUESTION: What is Aquadag? You show it in Figures Nos. 1 and 10 of the PHOTOFACT Television Course, but no detailed explanation is given of its use.

ANSWER: Aquadag is a liquid (a colloidal graphite dispersion or suspension) used to coat the interior of cathode ray tubes, which is manufactured by the Acheson Colloids Corporation of Port Huron, Michigan. This Company advises that Aquadag is being superseded by especially developed material for cathode ray tube coating called "Dag Dispersion No. 191," now being used by several large tube makers. As far as the television service technician is concerned, however, the two substances, Dag and Aquadag, may be considered as identical. When a piece of glass or other materials is coated with Aquadag and dried under appropriate conditions, a coating (a tightly adhering opaque homogenous graphitic film) is obtained which is an excellent conductor of electricity, chemically inert, and low in photo-electric sensitivity.

To properly focus and to speed up the beam of a cathode ray tube, accelerating anodes are required. One of these may consist only of the Aquadag coating; or it may consist of a separate metal structure, with a connection to the Aquadag coating. In any event, the interior graphitic coating is connected to the positive potential end of the power supply.

In addition, the coating serves another valuable purpose. Because the screen is bombarded with high velocity electrons, a secondary emission effect occurs in that the screen itself emits low velocity secondary electrons, which in turn tends to form a cloud near the surface of the screen. The positive charge of the Aquadag coating attracts these stray electrons, so that they do not interfere with the production of clear, sharply defined pictures of proper contrast.

Originally, the interior of cathode ray tubes were coated with silver to make them conductive, and they were then coated with graphite to blacken the shiny surface to eliminate unwanted reflections. It has since been found that the graphite coating is sufficiently conductive to eliminate the necessity of the metallic coating.

A few tubes have appeared recently with both an interior and an exterior Aquadag coating on the tube's envelope. The outside coating connects to the negative side of the high voltage supply; the two coatings then serve as a high-voltage filter for the elimination of ripple or hum. This is done to reduce costs without sacrificing performance.

We wish to acknowledge the co-operation of the Acheson Colloids Company of Port Huron, Michigan, in supplying us with technical data on their products.

★

HOW LONG?

QUESTION: How many installments are there in the PHOTOFACT Television Course? How long will it run?

ANSWER: In our opinion, there is only one way of providing a satisfactory television course at the present stage of the art; and that is rewrite and re-edit each installment immediately before it goes to press. Television is too fast moving and too new for a course to be prepared weeks or months ahead and still be up-to-date.

In a class-room, an instructor can always amplify or bring up-to-date a statement made in a previous lecture. By our serial presentation of the Television Course, we have the same opportunity. A subscriber always gets the newest, the latest and the best instruction that is possible for experience, skilled brains and ample money to produce. The PHOTOFACT Television Course is based on a course taught by Mr. A. C. W. Saunders in his school. Our thinking always has been that for clarity of presentation, for a down-to-earth approach understandable by the service technician—for all of us in fact who are practical radio men and who must earn our living—Mr. Saunders' methods are of unique excellence. We are doing our utmost to preserve his simplicity and clarity of presentation—but to the solid foundation of the basic course we are carefully researching each topic, using our top technical staff for this purpose; and we are adding the facilities of our art department for exclusive exploded views and other added illustrations. We fully believe the adage that one picture is worth a thousand words.

Our engineers are head-over-heels in practical television; much of it for special work in connection with leading television laboratories. Because of these connections, we are able to edit the course to include the latest developments and the latest trends.

The results of this treatment will unfold as time goes on in lessons that are as up-to-date as your morning newspaper. Each succeeding lesson will bring added emphasis to the merit of our treatment. Actually and purposely, Television lesson, Installment 6, for this PHOTOFACT Set No. 43, was completed only in time to meet the deadline for this issue. This policy will be continued.

We do not know at the present time in how many sets of Folders the Course will run, although our goal is twenty installments or less. We do know that subscribers to PHOTOFACT Folders will always be kept up-to-date on the progress made in the Television art, because we will see to it that such progress is fully covered as it develops.

★

FEWER TUBES

QUESTION: Why are so many stages needed in a television receiver? Why can't a much simpler set be used when only local reception is desired?

ANSWER: It is true that on the broadcast band of 550 to 1600 k.c. a simple radio receiver of few tubes will give excellent reception. Additional r.f. and i.f. stages may not improve local station performance; though with the addition of extra stages better distance and better rejection of interference would be expected.

While on a broadcast band radio receiver a multi-stage i.f. amplifier is used to secure extra sharp selectivity; on a television receiver a multiple stage i.f. system or "i.f. strip" is used for exactly the opposite purpose. The required band-pass for television is 4½ megacycles—4,500 kilocycles—450 times the broadness that is optimum for an a.m. audio signal. Such extreme broadness can be obtained only by using heavily loaded circuits, plus over-coupling and/or staggered tuning. Such an operating condition results in very low gain, even with special high transconductance tubes.

As a final point, a television receiver requires a number of wave traps; and these must be inserted at the proper points in the i.f. circuits. Reducing the number of i.f. stages would not reduce the required number of wave traps, so that dropping i.f. stages would not produce the simplification which logically might be expected.

★

EDITOR'S NOTE:

Let's have more questions—lots of them. We can't answer your questions until you send them to us.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

GENERAL ELECTRIC H-116

(Pre-war)

A patron, Mr. S. P. Czekanski of 702 Fifth Avenue, Ford City, Pennsylvania, wrote us some time ago substantially as follows:

"In the factory schematic of the G.E. H-116 the trimmers T1 and T2 are shown as variable condensers; whereas, actually they are fixed, consisting of a dielectric coated with silver. On some of the units the silver coating has a tendency to peel, making it impossible to tune the i.f. to 455 kc. How can I repair the set?"

We asked G.E. about this, and here is what they said:

"The schematic is in error in showing the trimmers as variable. However, to repair it is not necessary to replace the entire i.f. transformer. I would suggest, that you replace the old trimmers with any ordinary mica or ceramic trimmers having a range from 150 to 200 mmf."

★ ★

IMPROVED TEST PRODS

"I am using a pair of darning needles for tips in a set of test prods designed to hold phonograph needles. Insulated with a piece of spaghetti that covers the body of the needle, you have a gadget that will *really* let you get at the hard-to-get-at points of check, without touching against anything else. Clip off the eye of the needle."

Submitted by: Mr. James T. Partin,
Partin's Radio Service, Pineville, Kentucky

McGRADE M100 INTERCOM

Photofact 476-27, Set 16

"Trouble: Loud hum.

"Replace the original 20-20 mfd. filter condenser with a 30-100 mfd. dual condenser with 150 volts rating. For excessive noise from the power line, change PHOTOFACT Item 8 to a .25 mfd. 200 volt condenser."

★

RCA 612V1, 2 and 3

Photofact 477-27, Set 17

"Complaint: Microphonic on the FM band.

"Adjust the rotor plates of tuning condensers so that they are centered in the air spaces between the stator plates, then realign the r.f. section."

★

RCA 8BX5 PORTABLE

Photofact Pending

"Complaint: Intermittent operation.

"Check the i.f. coils for wire strands touching the shield can inside coil."

★

RCA RP178 RECORD CHANGER

Photofact Pending

"Complaint: Erratic changer operation.

"The trouble may be due to worn or loose tire on the cycling cam. To replace this tire, the changer must be completely dismantled and reassembled."

Submitted by: Mr. R. W. Tackett
Radio Service Manager, Emerson Piano House, Inc.
143 North Main Street, Decatur, Illinois

★ ★

MOTOROLA 77FM21

Photofact 483-13, Set 33

"To fabricate a special wrench or screwdriver to adjust the FM cores, A17 and A18, use an octal tube base with pins cut off. Drill a 5/32" hole through the bakelite centering pin and file to fit.

"Better adjustment of A19 can be made by connecting an AM generator direct to FM antenna terminals instead of to the 12AT7 grid and B-minus. Adjust for minimum output."

Submitted by: Mr. Tom McCarthy, McCarthy's Radio Sales & Service, 147 East Main Street, Luray, Virginia

★ ★

PHILCO 46-350

Photofact 4610-24, Set 10

"The set operated normally at first, but sounded fuzzy after one hour of operation. A signal tracer isolated trouble to the first audio stage. The trouble was found to be the .1 filament by-pass condenser which would only short after heating. This condenser was replaced and the trouble did not occur again."

Submitted by: Mr. Paul S. Segars, Jr., Radio Service Dept.,
Scarritt Motors, Inc., 141 Second Avenue, S., St. Petersburg, Fla.

PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 5—Set No. 44 ..... **Aug. 15**
Volume 5—Set No. 45 ..... **Sept. 15**
Volume 5—Set No. 46 ..... **Sept. 15**
Volume 5—Set No. 47 ..... **Oct. 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

A TYPICAL ELECTROMAGNETIC DEFLECTION CENTERING AND FOCUSING CIRCUIT

Pages 10 and 11 of Chapter 1 illustrated and described the circuits for the control of beam centering in both horizontal and vertical directions in the case of the electrostatic type of picture tube. Pages 13 through 17 described the methods of focusing and deflecting the electron beam in an electromagnetically controlled picture tube. The circuits used for the control of focusing and centering of electromagnetic tubes were purposely not shown at that time, since they are inter-related with the action of sweep and deflection circuits and with the peculiar voltage waveform requirements of electromagnetic deflection.

Figure 73 shows the schematic diagram of the picture tube control circuits in a popular type of receiver design. It has been drawn in slightly different form from the presentation of service manuals in order to clarify circuit study. The circuit has been simplified to combine electrolytic capacitors in one unit at each point on the diagram where they occur as a single by-pass value. In the actual receivers, these units are often in separate cans in order to provide radiating area for the high ripple currents encountered.

FOCUS CONTROL ACTION: On pages 14 and 15 the action of the focus coil, L1 of Figure 73, was described and illustrated. By controlling the current through the coil, as determined by the setting of the variable resistor R1, the electron beam paths are brought together to form a very small, concentrated spot at the surface of the flourescent screen. In the circuit illustrated, a high current coil of relatively low resistance (250 ohms) has been used. This coil, together with the ion trap electromagnet coils, is placed in the negative return lead of the power supply system and carries a large portion of the total "B" current. In this example, the average current through the coil is approximately 115 ma. Other receiver designs may use focus coils having more turns of finer wire, hence higher resistance, in other parts of the supply circuit. Although the circuit shows R1 as a single variable resistor, this control is often part of a network of series and parallel resistors to achieve smoother control action.

As will be noted in Figure 22, page 17, the focus coil is mounted in such a manner that its axis can be rotated relative to the axis of the picture tube. We will see later that this serves two purposes; the positioning of the spot so that it is centered on the flourescent screen and also, in some receiver designs, a fixed control of the range of action of the "back mounted" centering controls.

ION TRAP CIRCUIT: Ion trap action was described and illustrated on pages 16 and 17. In this particular circuit, the ion trap magnet coils (L2) are shunted by resistor (R2). This shunt is used because the ion coil current for proper operation is less than the focus coil current (approximately 105 ma.).

Some of the latest receivers appearing on the market are employing permanent magnets of the "Alnico" type rather than electromagnets, for the ion trap action. The permanent magnet ion trap assembly is independent of the power supply circuits of the receiver and is another example of simplification in television receiver design.

VERTICAL CENTERING ACTION: The vertical centering circuit, shown in simplified form in inset A, Figure 73, consists of a series arrangement of the vertical deflection coils (L3), the vertical output transformer secondary (L4), and a source of DC voltage from the potentiometer R5. R5 is provided with a center tap, and it will be seen that, as the contact arm passes this center point, the voltage introduced into the series circuit changes polarity. In this way it is possible to produce a DC polarizing current through the deflection coils in either direction, causing a steady magnetic field bias to exist in the deflection system. The sawtooth scanning current operates about this bias as a center point, and the picture can be moved up or down on the face of the tube by adjustment of R5.

It is interesting to note that the by-pass capacitor (C1), across the centering potentiometer, has an unusually large value (1000 mfd). It serves a dual purpose: (a) to keep any residual hum originating in the filter system of the power supply from entering the vertical scanning system and thereby causing interference with the 60 cycle scanning action; and (b) to keep the combination sawtooth-pulse voltage wave of vertical scanning from interfering with the operation of the video and audio amplifier systems through introduction of ripple into the "B" supply circuits. While this capacitor has been rated in microfarads as a matter of con-

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venience, the design engineer specifies its measurement in terms of impedance over the frequency range which it must by-pass. This fact is mentioned because the actual value in microfarads may vary greatly as measured by a bridge or capacitance tester, and yet have sufficiently low impedance to do an adequate by-passing job.

HORIZONTAL CENTERING ACTION: Horizontal centering circuits in pre-war receivers were usually of the same type as that just described for vertical centering (a center-tapped wire-wound control carrying high current in the "B" return). In post-war receivers this has been abandoned in favor of an expedient which allows circuit simplification.

Inset B, Figure 73, shows, in simplified form, that portion of the large diagram which governs horizontal centering. As before, we find a series circuit consisting of the horizontal deflection coils (L4), the secondary of the horizontal output transformer (L6) with its shunt"width"control coil (L7), and the source of centering voltage, potentiometer R6. In this circuit, however, the DC bias current through the horizontal deflection coils cannot be made to reverse in direction as was possible in the case of the vertical centering system.

To obtain the equivalent of control in both directions, use is made of the fact that positioning of the focus coil, in its mounting, can exert a magnetic field bias on the electron beam. In practice, when initial receiver installation is in process, the following steps are taken:

1. The horizontal centering control, potentiometer R6, is first set in the middle of its range.

2. The position of the focus coil is adjusted in its mounting to center the "raster" in the picture area.

3. Adjustment of R6 will now serve to make minor correction of the picture in the horizontal direction (right or left). The focus coil position has provided a magnetic field bias which is equivalent to the introduction of an opposing current to that flowing in the series deflection circuit, due to the initial setting of potentiometer R6.

There appears to be a trend, as evidenced by the latest receivers appearing on the market, to dispense entirely with the use of potentiometer type centering controls.

In these sets, mechanical adjustment of focus coil position has been improved by the use of four corner adjustment screws. These screws have been provided with spring backing to assure that their adjustment will not change. Access to these screws is provided from the rear of the receiver without the necessity of removing the cabinet back panel. It is possible to make either horizontal or vertical centering corrections by these purely mechanical adjustments.

HORIZONTAL SWEEP DAMPING CIRCUITS

The horizontal output circuit of Figure 73 will be recognized as the high voltage supply system described on pages 29 and 30, which utilizes the collapse of magnetic energy in the horizontal output transformer and horizontal deflection yoke. No explanation was given at point of the action of the 5V4G "damping" or "reaction scanning" tube. Its function, as well as the action of the horizontal linearity control (inductor L8), and horizontal width control (inductor L7), will now be considered. This tube, together with its associated circuit components, is used to stop or "damp out" oscillations in the system, and help produce the required linear current sawtooth through the deflection coils.

Referring again to Figure 65, which illustrated the timing requirements of the horizontal sawtooth current wave, it will be seen that retrace must be accomplished in the extremely short time of 7 microseconds. Since the deflection coil system is predominately inductive, it is necessary to employ a different method of operation than that of the lower frequency vertical system. To obtain the rapid reversal of current through the horizontal deflection coils, the output transformer and deflection coil circuit is tuned to a frequency of approximately 71 kilocycles by the associated circuit capacitances. This frequency is used because one half cycle of oscillation is equal to the required retrace time of 7 microseconds.

The current through the deflection coils is at its maximum value at either the extreme left or extreme right of the picture frame, the axis or zero point occurring at the center.

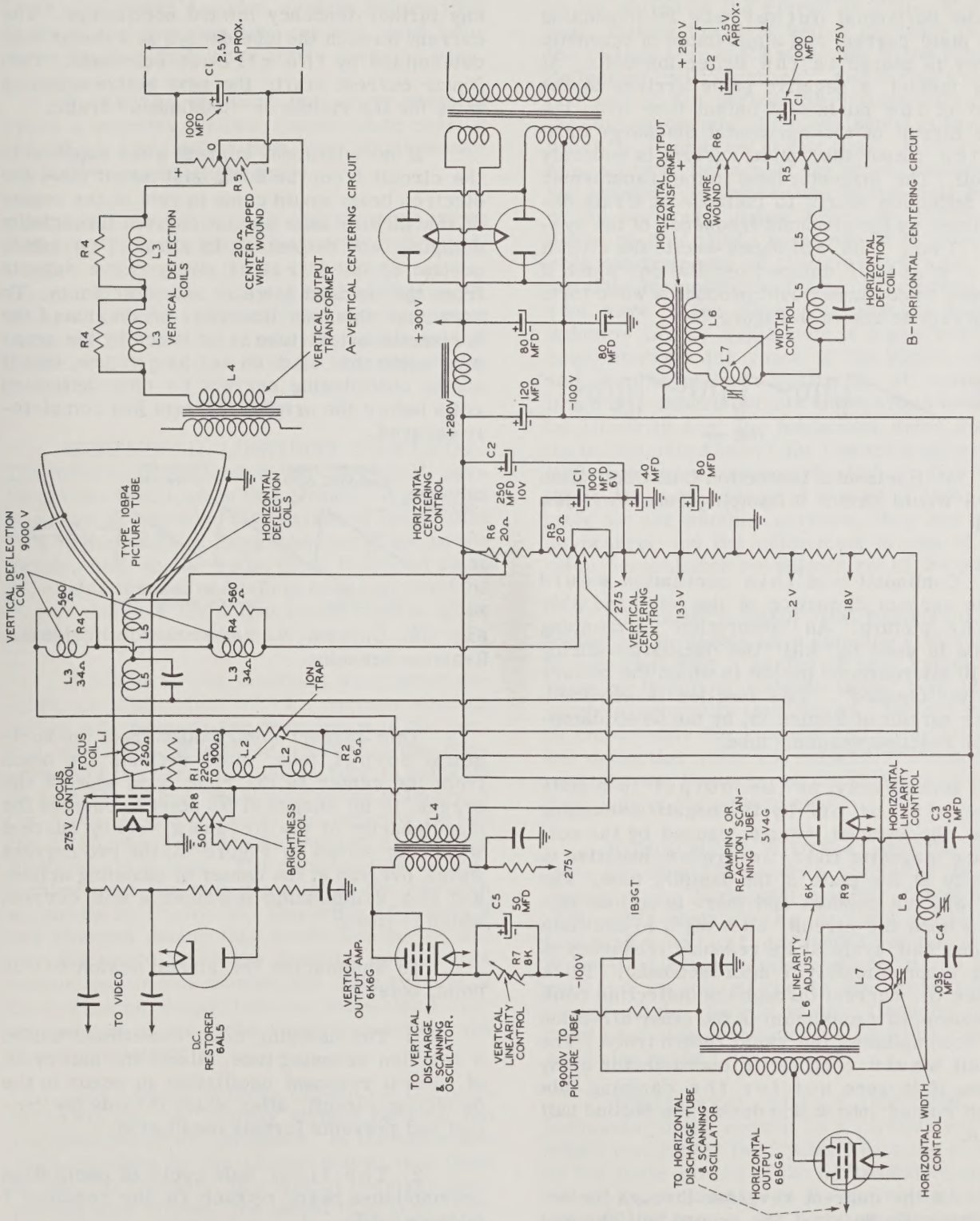


Fig. 73. A Typical Electromagnetic Deflection System

When the right hand end of the trace is reached, the horizontal output tube is conducting high plate current and a maximum of magnetic energy is stored in the deflection coils. At this instant, a negative pulse arrives at the grid of the horizontal output tube from the plate circuit of the horizontal discharge tube, and the output tube plate current is suddenly cut off. The magnetic field in the transformer and deflection starts to collapse at a rate determined by the resonant frequency of the system (71 kc). This will shock-excite the circuit into a state of damped oscillation, which if allowed to continue would produce a wave form of current as shown in Figure 74.

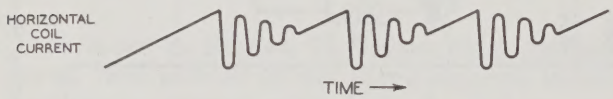


Fig. 74. Horizontal Deflection Coil Oscillation Which Would Occur If Damping Tube Were Not Used

Continuation of this oscillation would cause serious distortion of the left hand side of the picture. An "absorption" or damping device is used to "kill" the oscillation during the 10 microsecond period in which the picture tube is "blanked". This function is provided, in the circuit of Figure 73, by the 5V4G damping or reaction scanning tube.

Immediately, as the output tube plate current is cut off by the negative scanning pulse, the induced voltage, caused by the collapsing magnetic field, becomes negative in polarity at the plate of the damping tube. The tube will not conduct and there is no load imposed upon the circuit, allowing it to oscillate for one half cycle at its resonant frequency of 71 kc (approzimately 7 microseconds). This causes the current through the deflection coils to reverse to a maximum in the other direction and accomplishes the rapid return trace. The circuit would continue to oscillate for many cycles if it were not for the damping tube which comes into action during the second half cycle.

As the current reverses through the deflection coils to start the second half cycle of oscillation, the voltage of self induction also reverses and the polarity becomes positive at the plate of the damping tube. This tube starts conducting and acts as a load across the terminals of the deflection coil system, preventing any further tendency toward oscillation. The current through the tube decays at a linear rate determined by the circuit constants. This linear current starts the next active scanning wave for the visible or "unblanked" trace.

If no additional current were supplied to the circuit from the horizontal output tube, the electron beam would come to rest at the center of the picture tube as the current through the damping tube decreased to zero. The latter portion of the current decay curve departs from the desired linear sawtooth form. To overcome this non-linearity, conduction of the horizontal output tube is so timed by the scanning generator and discharge tube, that it starts contributing current to the deflection coils before the original current has completely decayed.

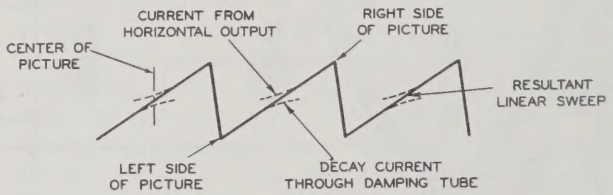


Fig. 75. Current Waveforms In Horizontal Reaction Scanning

This current contribution from the horizontal output tube, which deflects the beam from the center to the right hand side of the screen, is so shaped at its start to correct the non-linearity of the original decay current wave. As shown in Figure 75, the two current waves overlap at the center of scanning action, and the combination produces a coil current which is linear.

To summarize the circuit action to this point, note:

1. The damping tube, sometimes called a reaction scanning tube, allows one half cycle of natural resonant oscillation to occur in the deflection circuit, after which it loads the circuit and prevents further oscillation.

2. The first half cycle of oscillation accomplishes beam retrace in the required 7 microseconds.

3. Decay of current through the damping tube produces the first half of the 53 microsecond active trace.

4. The horizontal output tube starts to contribute power to the system before final decay of the damping tube current, and produces the final half of the active scanning wave.

5. At the end of the active scanning cycle, a negative pulse causes plate current cut-off of the output tube, and starts a new oscillation to repeat the cycle.

CONTROL FUNCTIONS IDENTIFIED WITH HORIZONTAL SWEEP DAMPING CIRCUITS: Three adjustable circuit components appear associated with the damping tube of Figure 73. These are the horizontal linearity control (inductor L8), the horizontal width control (inductor L7), and the linearity adjustment (resistor R9).

HORIZONTAL LINEARITY CONTROL. The network comprised of L8, C3, and C4, performs two functions in this circuit. It provides a means of operating the horizontal output tube at a higher plate voltage than that of the power supply, and, at the same time, functions as an adjustable means for making small corrections in the shape of the active sweep section of the sawtooth current wave.

Since these two functions are inter-related, an explanation of the voltage addition action will precede the description of the control operation. It will be noted that the plate voltage of the horizontal output tube is supplied by a series circuit consisting of the primary of the output transformer, the inductor L8 and the cathode-to-plate conducting path of the 5V4G damping tube. The damping tube is conducting over the major portion of the sawtooth as shown in Figure 75. Capacitors C3 and C4 are charged during this conduction period and then discharge while the damping tube is not conducting. In this manner, the plate current of the horizontal output tube is maintained over the portion of the cycle when the damping tube is not conducting.

The charge on these capacitors is greater than the "B" supply voltage because the rectified surge or "kickback" of the deflection coils is added to the charge placed upon them by the "B" supply. In a typical receiver, employing this circuit, the output tube plate voltage is approximately 50 volts higher than the "B" voltage.

It will be noted that capacitors C3 and C4 do not seem to be high enough in value to act as storage capacitors. This fact is a clue to the action of the circuit as a linearity control. During the first half of the trace period, the voltage across C3 rises due to the rectified deflection coil "kickback", and during the second half of the period, the voltage falls due to the current demand of the horizontal output tube which is conducting at that time. In this manner, a ripple voltage of the same frequency as the sawtooth is impressed on the plate supply of the horizontal output tube. By shifting the phase of this ripple with respect to plate current requirements of the output tube, it is possible to modify the shape of the output current wave of the tube. Changing the value of inductor L8, by adjustment of a powdered iron core, controls the phase of the ripple current and permits minor adjustments of horizontal linearity. Other controls which affect horizontal linearity are, the horizontal drive control (to be described later), the linearity adjustment (R9), and the horizontal width control (L7). While the major effect of certain of these controls is for another purpose, they are inter-de-pendent and the adjustment of one of them often necessitates re-adjustment of the others.

LINEARITY ADJUSTING RESISTOR. Resistor R9 is known as a damping resistor and is provided with a series of taps rather than being made continuously variable. This adjustment is primarily intended as a factory means to compensate for manufacturing variations in the deflection yoke and output transformer. It controls the linearity of the trace on the left hand side of the picture only.

HORIZONTAL WIDTH CONTROL. Variable inductor L7 shunts a portion of the secondary of the horizontal output transformer (L6). This controls the output voltage and hence the extent or "width" of the sweep. Since it also has a minor effect on the phase relations in the plate of the output tube, it causes slight changes in the linearity of the right hand side of the picture, as width changes are being made.

HORIZONTAL DRIVE CONTROL. The horizontal drive control is a variable resistor which constitutes the "pulse" forming element in the plate circuit of the horizontal discharge tube. An explanation of its action appears on page 60. Figure 34 on page 29 shows its application to the circuit under discussion. The value of this resistor determines the ratio of the negative pulse amplitude to the sawtooth amplitude impressed on the grid of the hori-

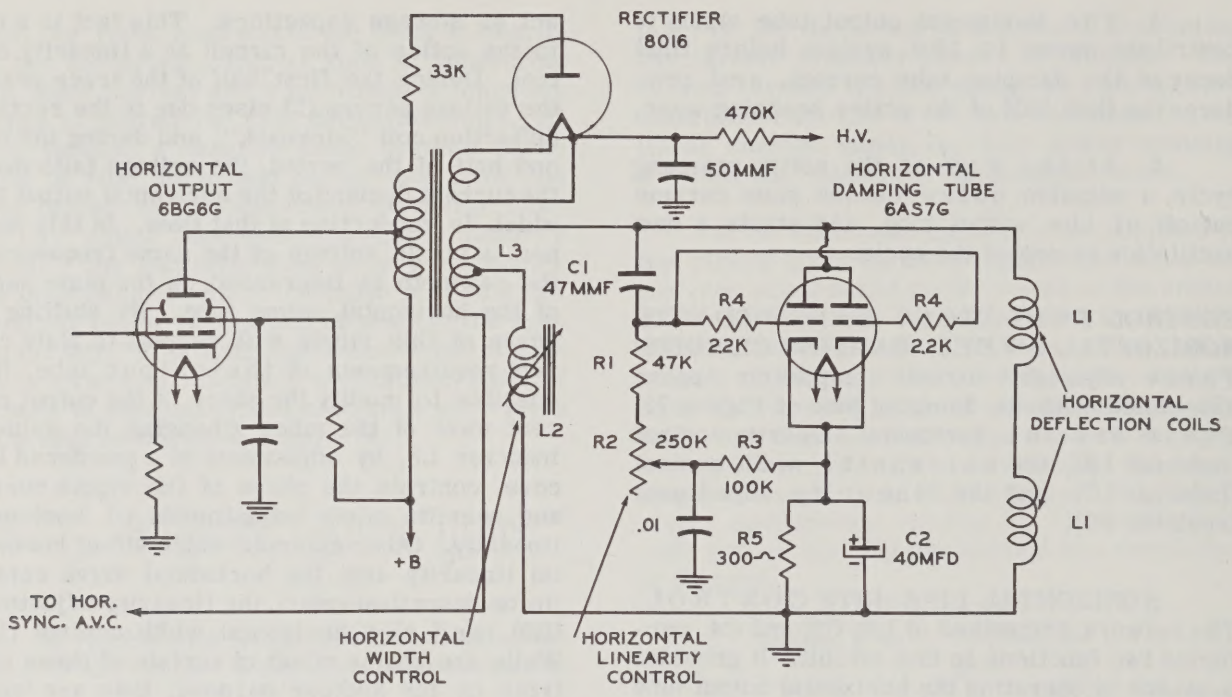


Fig. 76. Use Of Triode As Horizontal Damping Tube

zontal output tube. It can, therefore, control the point on the trace at which the output tube conducts. Increasing its value causes a greater picture width, crowds the right side of the picture and stretches the left side. Adjustment may require a new setting of the horizontal "width" control.

USE OF THE TRIODE FOR HORIZONTAL DAMPING: In the circuit just discussed, a power rectifier type of diode (5V4G) was used to damp the oscillation produced in the horizontal deflection coil system, by cut-off of output tube plate current. In some receivers, a triode is used as the damping tube, since the presence of a control grid gives the designer another opportunity to modify circuit action to obtain better sweep linearity.

Figure 76 illustrates a circuit application of the 6AS7G, low-mu, dual, power triode, as a damping tube. To act effectively as a damping tube, the plate resistance must be very low during the conduction period. The 6AS7G was designed especially for voltage regulator and television work and meets this requirement.

The circuit conditions at the instant of plate current cut-off in the horizontal output tube are similar to those just described for the 5V4G. The natural resonant frequency of the deflection circuit is approximately 71 kc. The first half cycle of oscillation finds the plate of the tube negative and no plate conduction can occur. During this time (7 microseconds), horizontal retrace takes place.

On the next half cycle, the plate of the tube becomes positive, causing the following series of events:

1. Plate current immediately starts to flow, since no charge exists on C1 and the grid is at cathode or zero bias. The tube damps the oscillation.

2. Discharge of the energy, stored in the vertical deflection coils, through the tube begins to initiate the next active retrace.

3. At the start of conduction, capacitor C1 has been charged through the internal grid to cathode path of the tube. Resistors R4 in the grid circuit limit the grid current to a safe value.

4. The time constant of the discharge path, capacitor C1 and resistors R1 and R2, can be varied from 2 to 15 microseconds by the adjustment of R2.

5. The changing bias on the grid of the tube makes its plate resistance vary as scanning progresses, and allows the shape of the decay part of the curve of Figure 75 to be altered by adjustment of R2.

With this type of horizontal "linearity" control, the action is independent of the horizontal output tube plate circuit. Some interaction with the horizontal "width" control (L2 of Figure 76 occurs, however, and the setting of one may require the readjustment of the other.

The horizontal "width" control (L2) varies the proportion of the horizontal transformer output which reaches the deflection coils, thus controlling the sawtooth current strength and the width of the picture.

VERTICAL OUTPUT AMPLIFIER AND DEFLECTION CIRCUITS: The vertical deflection system of Figure 73 is much less involved in its action than the horizontal system shown. A type 6K6G, triode-connected, is used as the output amplifier. Transformer L4 matches the plate impedance of the tube to the resistance of the vertical deflecting coil assembly.

Any tendency for shock-excited oscillations to occur following vertical retrace is nullified by the damping resistors (R4) which are connected across the vertical deflection coils (L3).

The proper shape of the combination sawtooth and pulse wave of voltage is supplied to the vertical output tube grid from a blocking oscillator having a "peaking" C-R circuit in its output.

The only circuit element of this system which we have not covered is the vertical "linearity" control (R7).

VERTICAL LINEARITY CONTROL. The grid voltage versus plate current characteristic of the triode-connected 6K6G is not a straight line over its entire range. The cathode bias resistor (R7) is made variable to shift the point of operation of the tube. As the operating point is shifted along its curve, changes in shape of the output scanning wave occur. These variations are sufficient to correct any lack of vertical linearity.

Since the gain of the tube varies as the bias is changed, this linearity adjustment will also affect height, and readjustment of the vertical "height" control may be required after linearity correction.

TYPICAL DEFLECTION CIRCUITS AS USED IN COMMERCIAL RECEIVERS

An analysis of the sawtooth forming deflection circuits employed in twenty-two of the most popular current television receivers shows that the basic types of vacuum tube sawtooth generators described on pages 40 through 50 have been used in many differing combinations. The type of deflection system chosen for a particular design depends upon a number of factors. Of these design considerations two are of primary importance in determining the choice, namely:

1. The method of beam deflection (electrostatic or electromagnetic) determines whether a sawtooth of voltage or a sawtooth of current is required. The electrostatic requirement is readily accomplished in the generator circuit and we therefore find less diversity between sets using electrostatically controlled picture tubes.

2. The type of synchronizing system or method of using the "sync" pulses to "lock in" the sweep generator is also a determining factor in the choice of deflection circuit. While the details of separating the pulses from the signal and utilizing them for sweep control will be taken up in detail later, at this time it will be necessary to note that there are two basic types of synchronizing circuits used in television receivers at present. These are known as "triggered" sync and A. F. C. (automatic frequency control) or "flywheel" sync. Triggered sync may use any of the types of sawtooth generators previously discussed while A. F. C. sync usually employs the sine wave generator discussed briefly on page 49.

In the analysis of present day receivers, mentioned above, it was found that two basic deflection systems have been used in sets employing electrostatic beam control; the cathode-coupled multivibrator, and the blocking oscillator.

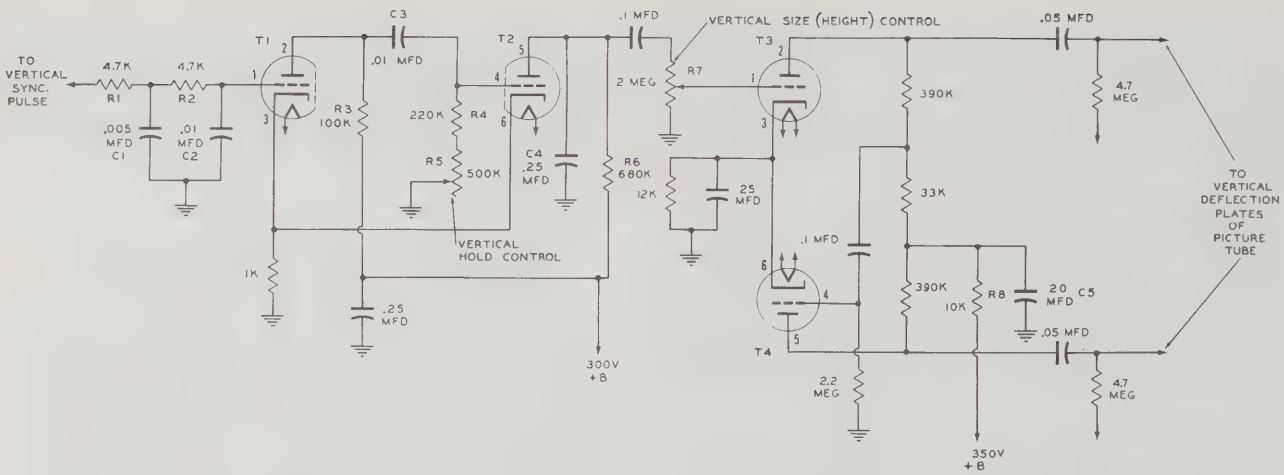


Fig. 77. Typical Vertical Deflection Circuit For An Electrostatic Picture Tube

TYPICAL COMMERCIAL ELECTROSTATIC DEFLECTION SYSTEMS: The requirements for electrostatic scanning, discussed on page 56, consist of the production of a sawtooth wave of voltage and its application to the deflection plates by a push-pull output circuit.

Two methods of meeting these requirements have appeared to date. The first, and most widely used, consists of a pulse controlled, cathode-coupled, multivibrator feeding a phase-inverted push-pull amplifier. The second method is an unusual adaptation of the blocking oscillator in which a single tube and its associated circuits fulfill all of the scanning requirements.

ELECTROSTATIC DEFLECTION CIRCUITS USING THE CATHODE-COUPLED MULTIVIBRATOR. The majority of electrostatic type television sets on the market, at present, employ the cathode-coupled multivibrator with a phase inverted amplifier for both horizontal and vertical systems. Since a number of differences in circuit constants and arrangement exist between the vertical and the horizontal systems, typical circuits of each will be discussed separately.

A Typical Vertical Deflection Circuit. Figure 77 shows a vertical deflection circuit which is typical of many receivers using the 7GP4 picture tube. Its action is as follows:

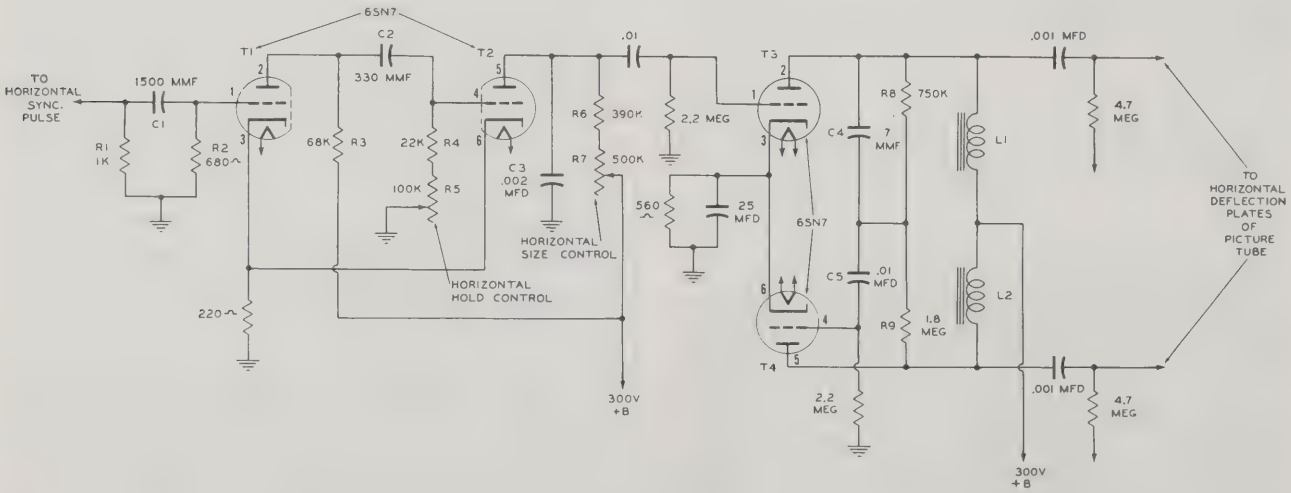


Fig. 78. Typical Horizontal Deflection Circuit For An Electrostatic Picture Tube

1. The vertical synchronizing signal, consisting of a series of pulses spaced as shown in Figure 66 (page 53), of negative polarization with respect to ground, passes through the network comprised of R1, C1, R2 and C2. This is known as an "integrating" circuit and its action is to add up all of the small "serrations" of the vertical signal as a voltage across capacitor C2, until the negative potential on the grid of T1 reaches a value corresponding to plate current cut-off. This "trips" the multivibrator circuit as described on pages 45 through 47.

2. The time constant, determined by the values of capacitor C3 and the sum of resistors R4 plus R5, controls the "free running" frequency of the multivibrator. R5 can readily adjust the frequency to "lock in" with the vertical sync pulse at 60 cycles per second and is called the vertical "hold" control.

3. During the interval between the "triggered" conduction pulses of T2, the sawtooth wave forming capacitor C4 is linearly charged from the "B" source through resistor R6. Firing of T2 by the "sync" pulse discharges C4, causing retrace.

4. Control R7 adjusts the input voltage impressed on the phase inverted, push-pull amplifier consisting of tubes T1 and T2 and since this control varies the output of the system it is known as the vertical "size" or "height" control.

5. The circuit associated with these tubes is of the same type as used in the audio system of many broadcast receivers and requires no further mention except to note:

a. The coupling capacitors and load resistors are of such values that the circuit gain remains flat to the low frequency of vertical scanning (60 cycles).

b. The plate decoupling capacitor (C5) has a higher value than would ordinarily be required for an audio system. This is necessary to keep the vertical sawtooth ripple out of the video and audio supply circuits.

This circuit has no "linearity" control. Such a control is not necessary because the sawtooth produced across C4 is sufficiently linear to provide good pictures.

A Typical Horizontal Deflection Circuit. Figure 78 illustrates the horizontal system employed in the same receiver as the vertical system of Figure 77. It is similar to the vertical system with the following exceptions:

1. The horizontal synchronizing signal, which consists of short time pulses (5 microseconds) at the end of each horizontal picture line as shown in Figure 65, are impressed upon the grid of T1 through the network comprising R1, C1 and R2. This is known as a "differentiating" circuit. Here the grid "triggering" voltage is taken across the resistor rather than across the capacitor as is done is the vertical circuit. It should be noted that the circuit sharpens the pulse and delivers a negative "stab" of voltage on the grid to "lock in" the oscillator at the proper time.

2. The time constant of "free running" oscillation, which is determined by the product of the value of C2 times the sum of R4 plus R5, is much shorter (1/262.5 of the vertical time) than the vertical time constant just discussed. This accounts for the lower values of capacitance and resistance as compared with those of Figure 77. Again, as in the vertical circuit, R5 can be adjusted to accomplish lock-in with the repetition rate of the "sync" pulses and is known as the horizontal "hold" control.

3. The size or width of the picture is adjusted by a voltage control in the plate circuit of T2 (R7 in series with "B" plus). This type of size control is sometimes used in both the vertical and horizontal circuits. It controls the charging voltage impressed on the sawtooth wave forming capacitor (C3) and hence the height of the wave.

4. The phase inversion circuit is a bit unusual as compared with familiar audio practice. Since the fundamental frequency of horizontal scanning is 15,750 cycles, the capacitance as well as the resistance balance must be considered. This accounts for capacitor C4.

5. A word or two of explanation is in order with regard to the use of the choke supply to the plates of T3 and T4. Many of the receivers on the market employ resistance coupling in this circuit as shown in the vertical circuit of Figure 77. Chokes can be employed in this case since the high frequency (15,750 cycles) allows an economical design in which the impedance of the chokes is high enough to have negligible shunting action across R8 and

R9 as far as the horizontal line frequency is concerned. The advantages from the use of chokes are that the plate voltage, and consequently the output, is higher and also that their series impedance acts as an excellent isolation of the system from the audio and video supply.

ELECTROSTATIC DEFLECTION CIRCUITS USING THE BLOCKING OSCILLATOR. An interesting combination of circuits, designed around the blocking oscillator, have recently made their appearance in a table model, electrostatically deflected receiver. The vertical and horizontal systems are shown in Figures 79 and 80 respectively.

VERTICAL DELFECTION CIRCUIT USING THE BLOCKING OSCILLATOR. Figure 79 combines a number of the circuit arrangements which we have covered separately in our consideration of sawtooth generators and deflection means. The circuit is conventional with regard to the blocking oscillator tube T1 and its associated circuit elements. The unusual features are found in the phase inverted, push-pull amplifier.

As in the cathode-coupled multivibrator just described, an "integrating" network (R1, C1, R2, C2) "sorts" the vertical sync pulse from the picture signal. In this case, however, the polarity of the pulse is positive with respect to ground. Control of the oscillator frequency by the pulse occurs as described on pages 54 and 55.

The adjustment of the oscillator "free-running" frequency is accomplished by control of the time constant of the C-R network in the grid circuit of the blocking oscillator tube T1. R5 in this circuit constitutes the vertical "hold" control.

Vertical "size" or "height" of the picture is controlled by adjusting the charging voltage impressed on the sawtooth wave-forming capacitor (C6) by means of the vertical "size" control (R7).

The phase inverted, push-pull amplifier (T2-T3) is a 6SL7GT high-mu twin-triode. The voltage division, to supply the grid voltage of T3, is by means of a capacitance voltage divider, consisting of C7 and C8, rather than the usual resistance divider found in the audio systems of broadcast receivers. "Contact" bias of both tubes is derived by grid current through the 10 megohm grid resistors (R8 and R9). The plate supply voltage of approximately 900 volts (from a bleeder across the high voltage supply) feeds the tubes through the 4.7 megohm plate resistors (R10 and R11). The actual voltage at the plate is approximately 450 volts. With this supply, it is possible to derive a plate swing of approximately 700 volts.

As in the case of the cathode-coupled multivibrator circuit, the linearity of the sawtooth voltage wave produced by this circuit is sufficiently good to assure satisfactory pictures. Therefore, no "linearity" control is required.

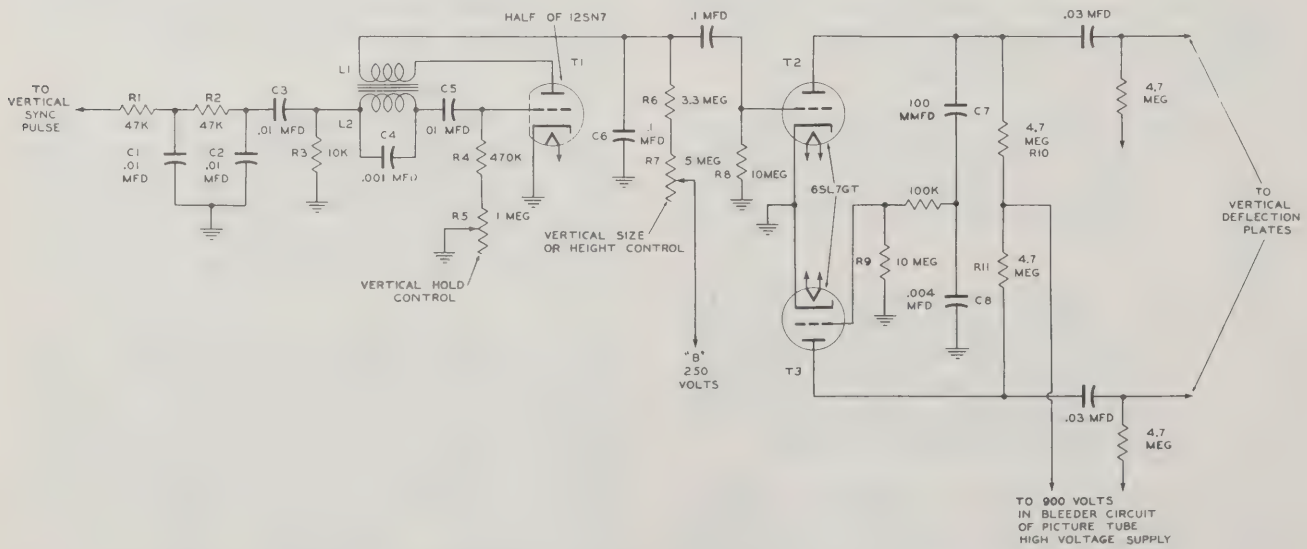


Fig. 79. Blocking Oscillator - Vertical Electrostatic Deflection Circuit

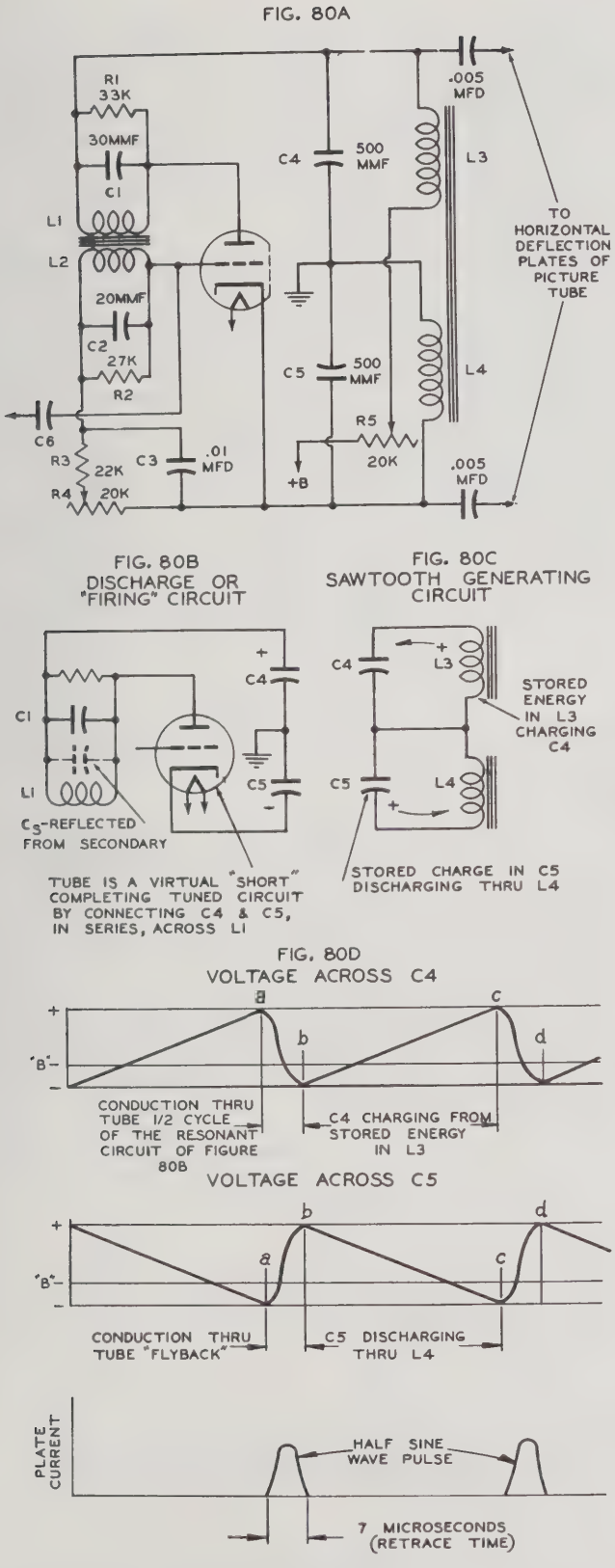


Fig. 80. Blocking Oscillator - Horizontal Electrostatic Deflection Circuit

Horizontal Deflection Circuit Using the Blocking Oscillator. In the horizontal system employing the blocking oscillator, the deflection sawtooth voltages (balanced to ground) are developed in the oscillator itself. No amplifier stage is required. With a DC plate supply of only 250 volts this circuit delivers a balanced linear sweep of 1200 volts, peak to peak, to the deflection plates of the picture tube. This circuit differs from the customary blocking oscillator in that the cathode is not grounded. The plate-to-ground and cathode-to-ground circuits are symmetrically arranged with respect to ground or "B" minus. This accounts for its balanced or push-pull output.

In explanation of the action of the circuit (see Figures 80A, B, C and D) it will be instructive to follow, in sequence, the steps in the production of a sawtooth voltage wave.

1. Let us assume that we are at point "a" of Figure 80D, and that a positive sync pulse through C6 (Figure 80A) is starting to "fire" the tube. This causes plate current conduction, and provides a low resistance path for the discharge of capacitors C4 and C5 through the tube and the primary of the feedback transformer. (See Figure 80B.)

2. The plate winding of the transformer is the inductive branch of a tuned circuit. This tuned circuit consists of L1 with a group of tuning capacitances. These are: C1; Cs, the reflected capacitance from the secondary, or grid winding; and the series combination of C4 and C5. This tuned circuit is resonant to approximately 71 kc, corresponding to a frequency in which a half cycle is equal to the horizontal "flyback" time of 7 microseconds. (See Figure 65.)

3. When the tube conducts, as controlled by the positive sync pulse which has arrived at its grid, an oscillation starts in the plate circuit. This continues for the half cycle "a" to "b" of Figure 80D.

4. At the end of this half cycle, the grid has been driven to the point of plate current cut-off. The oscillation is now stopped for two reasons:

a. The tube, acting as a switch, has removed the main tuning capacitors C4 and C5.

b. Damping resistors R1 and R2 (Figure 80A) have suppressed any tendency toward further oscillation.

5. The swing of voltage, due to the half cycle of plate current oscillation, has caused a condition wherein the polarity of the charge on capacitors C4 and C5 has been reversed during the retrace period. We now find that at time "b" (Figure 80C), capacitors C4 and C5 are oppositely charged and the "high" side of C4 is negative with respect to ground. The cathode, or low side of C5, is positive with respect to ground.

6. Since the tube is now cut off, capacitors C4 and C5 have no other path, for charge or discharge, than the windings of the output chokes L3 and L4. These choke windings are shown on the same core in Figure 79A, as in the actual receiver. This construction is not essential for the operation of the circuit, and we have shown them as separate chokes in the partial circuit of Figure 80C. The inductance of these choke windings is high, and when such a high impedance choke is connected across a charged capacitor, the current flow is constant and the voltage across the capacitor changes linearly with time.

7. During the time interval from "b" to "c" of Figure 80D, capacitor C4 is being charged linearly by the voltage of self induction of choke L3, Current starts flowing from the "B" source to sustain the charging cycle.

8. During the same time interval, the charge in capacitor C5, due to the resonant swing of voltage during the "firing" cycle, discharges through choke L4 and produces the sawtooth voltage wave shown in Figure 80D. It is seen that the sawtooth waves across C3 and C4 are symmetrical and of opposite polarity. Hence, the requirements for balanced electrostatic deflection have been fulfilled.

Another method of explaining the sweep interval (time "b" to "c", Figure 80D) is to consider the chokes and their parallel sawtooth wave-forming capacitors as individual tuned circuits. These circuits are resonant at approximately 1/10th of the horizontal line frequency, or about 1600 cycles. The portion of a sine wave where the curve passes through zero and reverses voltage is very close to a straight line. At time "b", an oscillation starts in these tuned circuits, but it is allowed to continue only for about 1/10th of a cycle. The wave produced is still on the essentially linear portion of the sine curve when the next firing interval occurs and starts a new wave.

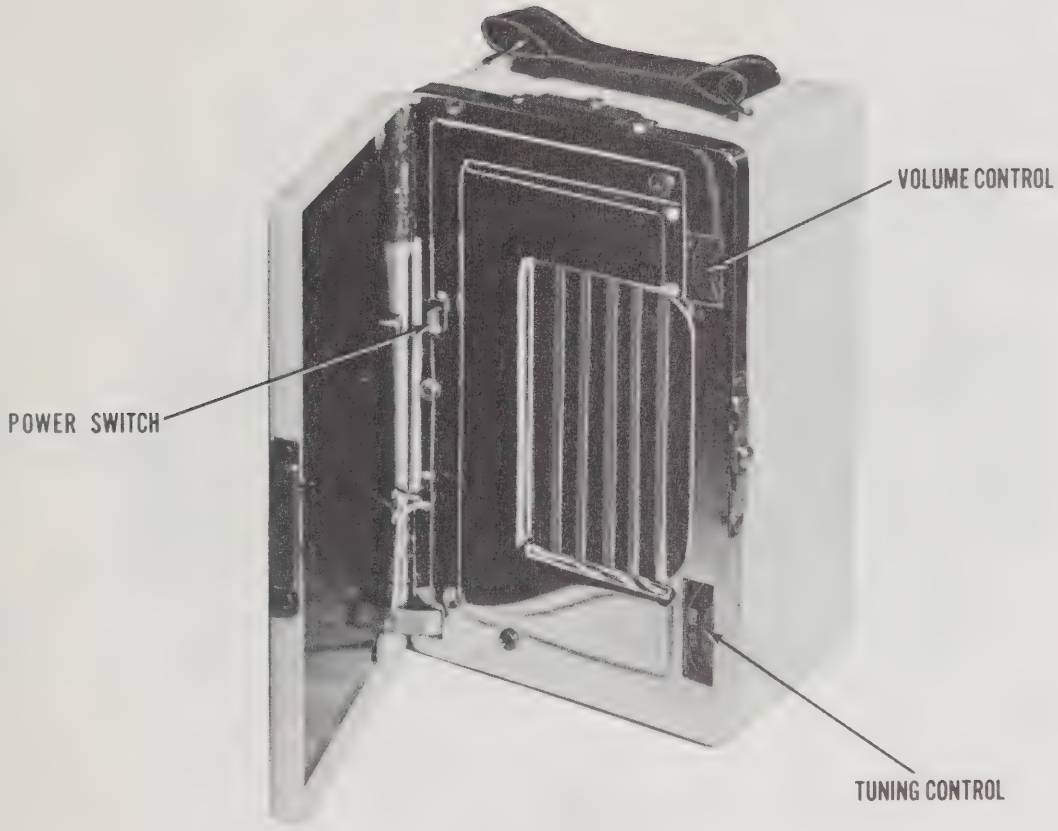
The free running frequency of blocking action is controlled by the time constant of the grid circuit. Therefore, resistor R4 functions as a "hold" control.

Resistor R5 functions as a "width" or "size" control by adjusting the value of voltage applied to the plate circuit and consequently controls the amplitude of the sawtooth wave.

Coupling capacitor C6 serves to introduce the horizontal sync pulse which "trips" the grid voltage and "locks" the oscillator at the proper time for synchronization with the transmitted signal.

Typical Electromagnetic Deflection Systems arranged in the order of their commercial application and the beginning of the study of "Beam Modulation and Synchronization" will be covered in Installment No. Seven.

AIR KING MODEL A-426
BATTERY OPERATED



AIR KING MODEL A-426
BATTERY OPERATED

AIR KING MODEL A-426

TRADE NAME	Air King, Model A-426
MANUFACTURER	Air King Products Co., 170-53rd St., Brooklyn 19, N.Y.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output
POWER SUPPLY	1.5 Volts "A" Supply and 45 Volts "B" Supply
RATING	240MA @ 1.5 Volts DC and 10.2MA @ 45 Volts DC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output or signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2		Loop	1650KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 8/48-#4813-1 SET #43-FOLDER #1

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIR KING PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIR KING PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	8	100		PRS150/8	BR815	M-8-150	UT-81	Filter
6	.002	150			ZZW1D2	TST-2-002		Output Plate Bypass
7	.002	150			ZZW1D2	TST-2-002		Audio Coupling
8	.01	150			ZZW1S1	TST-2-01		AF Screen Bypass
9	.002	150			ZZW1D2	TST-2-002		Audio Coupling
10	.01	150			ZZW1S1	TST-2-01		AVC Filter
11	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
12	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
13	150	300		1468-0005	5W5T15	MO.5-315	1FM-315	RF Bypass
14	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

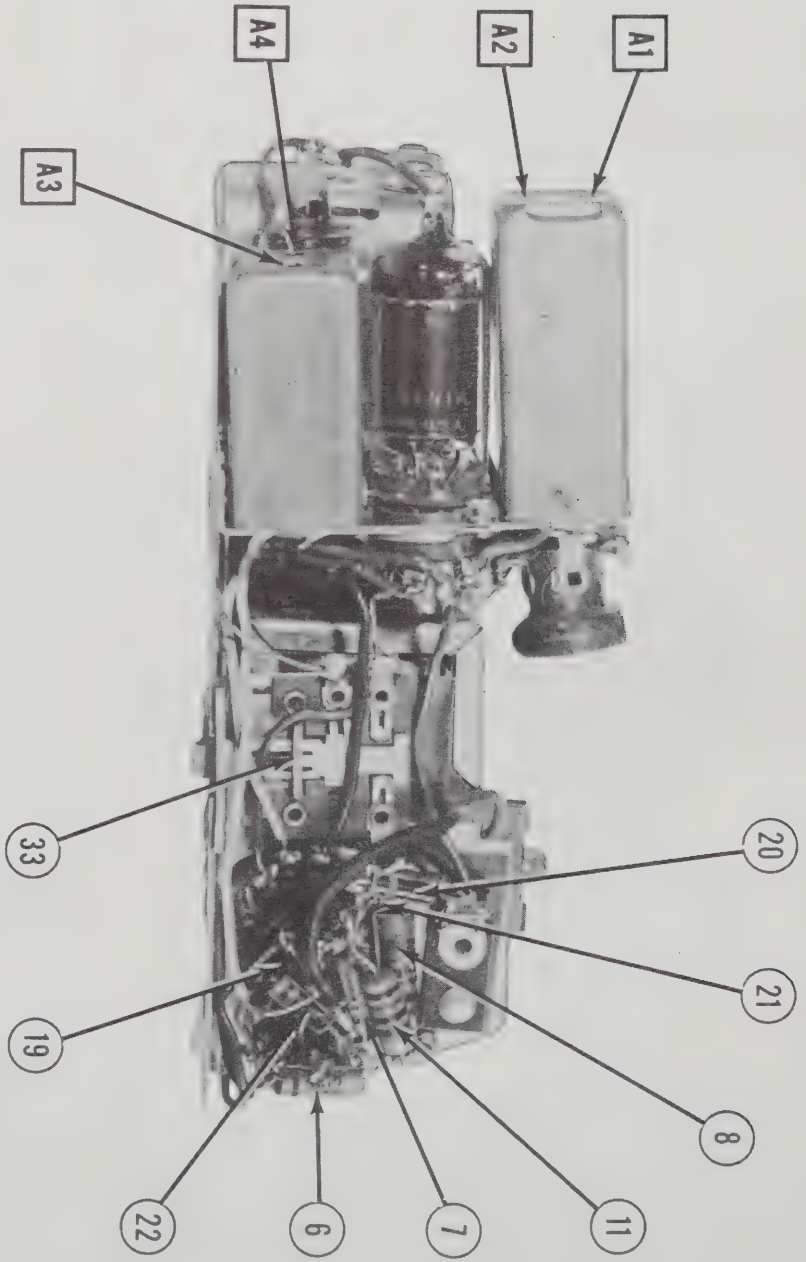
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIR KING PART No.	IRC PART No.	CLAROSTAT PART No.	
15	1 Meg.	½				Volume Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIR KING PART No.	IRC PART No.	
16	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Osc. Grid
17	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Bias Network
19	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
20	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen
21	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
22	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Bias Network

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR KING PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
24A	5000Ω	11.5	200Ω	1Ω	1347	A-3329		A-2998	
B					1348*				*Used with speaker, Item 25B

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIR KING PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
25A	PM	11.5Ω	58110			
B			58111#			#Used with output transformer Item 24B
	CONE DIA.	VC DIA.				
26	2-5/16"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIR KING PART No.	MEISSNER PART No.	
27	Loop Ant.		3.6Ω	28231		Alternate loop Part #28232
28	Osc. Coil	1.6Ω	7.2Ω	28229		Alternate osc. coil Part #28230
29	Input IF	23.2Ω	22.2Ω	3385		
30	Output IF	15.8Ω	15.6Ω	3540		

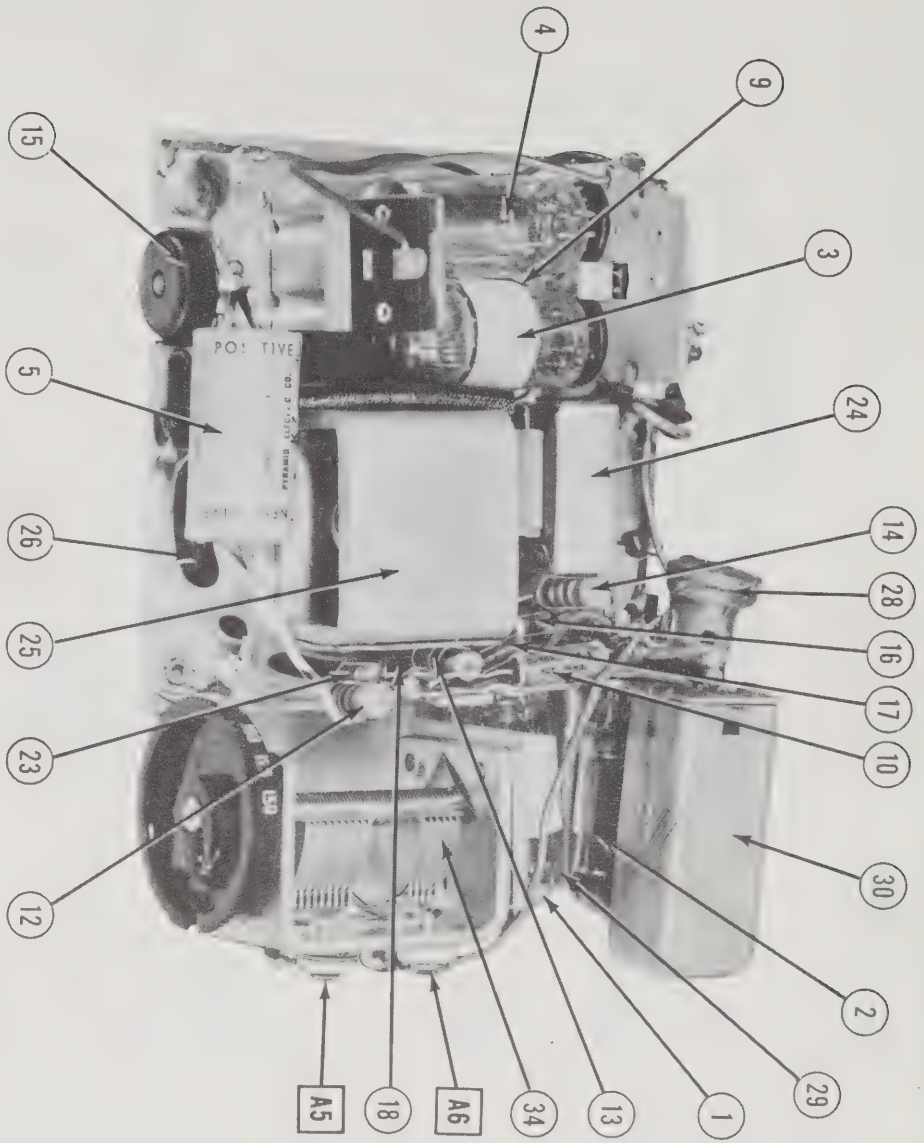
BATTERIES

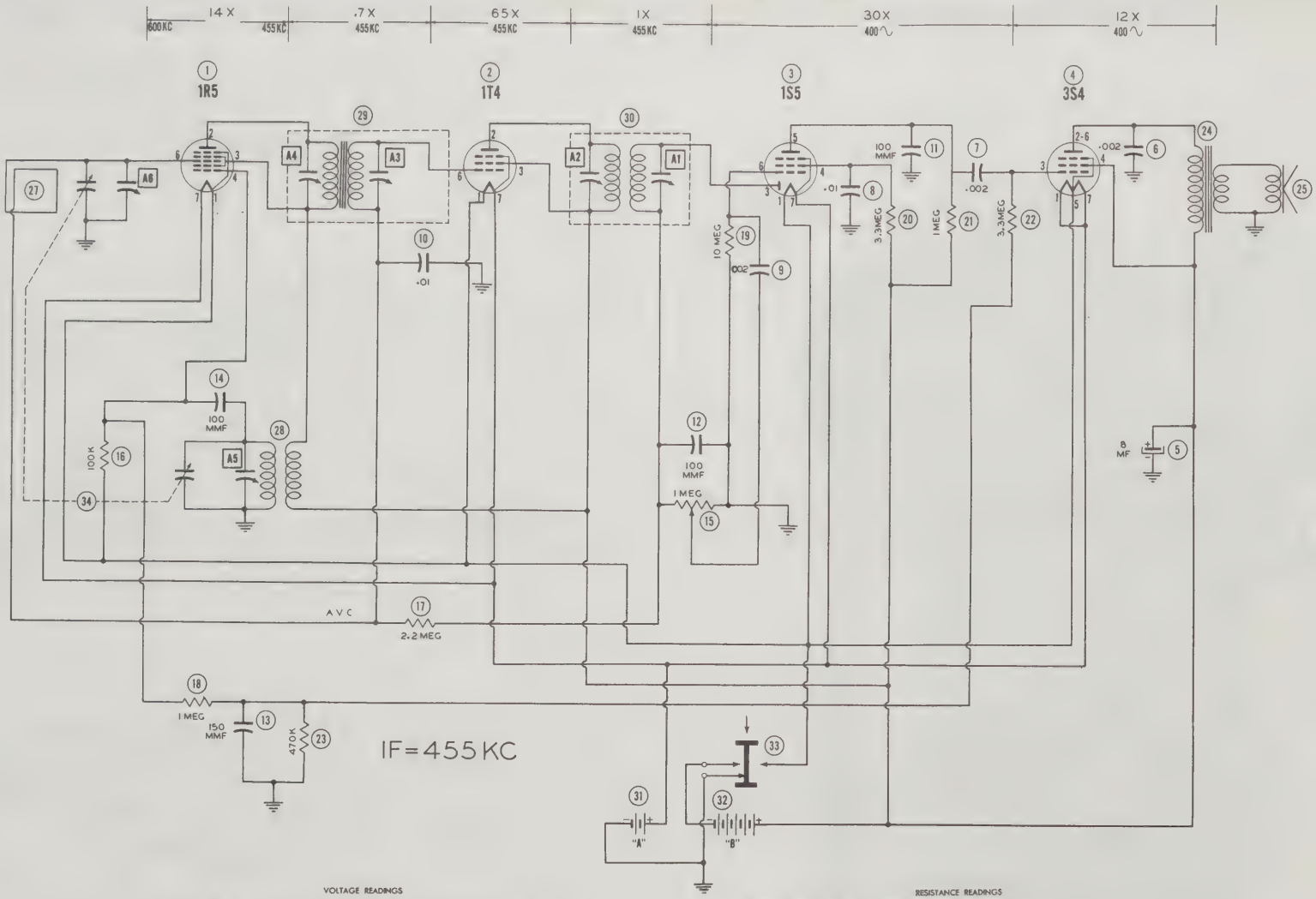
ITEM No.	VOLTAGE	AIR KING PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
31	1.5V "A"		#950			2R			
32	45V "B"			#455			XX30		

MISCELLANEOUS

ITEM No.	PART NAME	AIR KING PART No.	NOTES
33	Switch		On-Off
34A	2 Gang Var. Cap.	16161	(13-282MMF, 20-136MMF)
B	" " " "	16162	Alternate
	Cabinet	6036	
	Cover	6036	
	Loop Cover	6261	

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	45VDC	45VDC	-14VDC§	0V.	-.05VDC	1.45VDC
2	1T4	0V.	45VDC	45VDC	-.05VDC	0V.	-.05VDC	1.45VDC
3	1S5	0V.	-1.2VDC	-.05VDC	8VDC	12VDC	0V.	1.45VDC
4	3S4	1.45VDC	44VDC	-.2VDC	45VDC	0V.	44VDC	1.45VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	100KΩ	100KΩ	100KΩ	0Ω	3.2 Meg.	*
2	1T4	0Ω	100KΩ	100KΩ	3.2 Meg.	0Ω	3.2 Meg.	*
3	1S5	0Ω	310KΩ	1 Meg.	3.4 Meg.	1.1 Meg.	10 Meg.	*
4	3S4	*	100KΩ	3.7 Meg.	100KΩ	0Ω	100KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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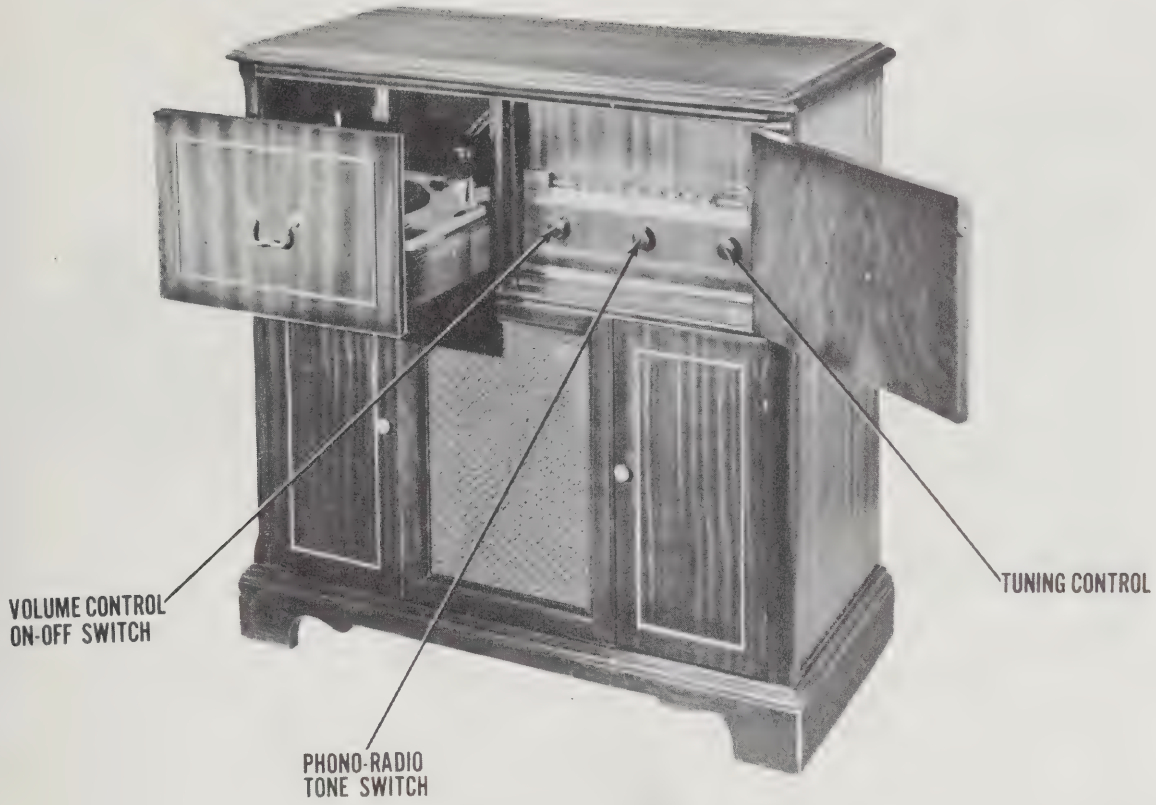
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.



AIRLINE MODEL
74KR-2713A

AIRLINE MODEL
74KR-2713A

AIRLINE MODEL 74KR-2713A

TRADE NAME	Airline, Model 74KR-2713A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .5 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	200MMFD	High side to ext. ant.terminal. Low side to chassis.	1620KC	"	"	A5	" " " "
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6,A7	" " " "

DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs.
2. Remove two wood screws holding loop antenna in cabinet. Remove loop antenna plug from rear of chassis. Remove loop ant. from cabinet.
3. Remove phono-pickup plug from rear of chassis.
4. Remove phono-motor plug from rear of chassis.
5. Disconnect speaker plug.
6. Remove two wood screws and two machine screws holding chassis in cabinet. Remove chassis from cabinet.
7. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

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DATE 8/48-#4813-2 SET #43-FOLDER #2

PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL 74KR-2713A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC-AF	6SQ7	6SQ7	8Q	
5	Power Output	6V6GT	6V6GT	7AC	
6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	15	450	25688	AF44J4A	UP2245C	DY-312	EL-353	▲ Filter
B	15	450						■ "
C	20	25						Cathode Bypass
8	.005	600	25689	684-005	DT6D5	MPH-6-005	TC-25	Line Filter
9	.005	600	25689	684-005	DT6D5	MPH-6-005	TC-25	" "
10	.01	600		684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
11	.05	600	8878	684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
12	.005	600	25689	684-005	DT6D5	ST-6-005	TC-25	" "
13	.005	600	25689	684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
14	.005	600	25689	684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
15	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	Audio Coupling
16	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	IF Cathode Bypass
17	.1	400	17647	484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
18	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
19	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	" "
20	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	" "
21	.01	400	8583	484-01	DT4S1	ST-4-01	TC-11	Ext. Ant. Coupling
22	200	500	14370	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
23	70	500	25964	1468-000075	5W5Q7	MOS.5-47	1FM-475	Tone Compensation
24	100	500	8872	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

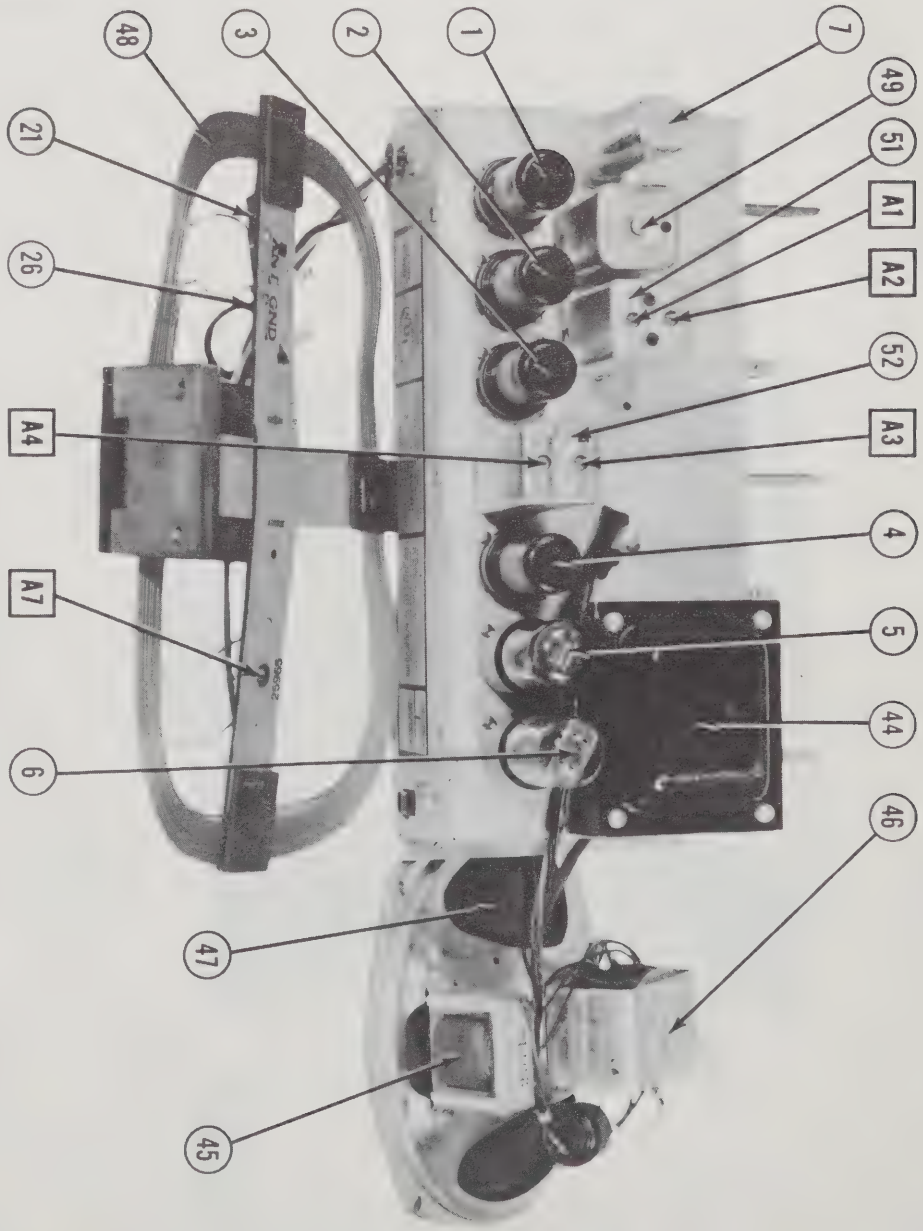
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	2 Meg.	½	25690	D13-139X	T-115	Volume Control tapped @ 500KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 25A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	IDENTIFICATION CODES
26	100Ω	½	25414	BTS-100Ω	Br.-Blk.-Red Antenna Loading
27	100KΩ	½	8885	BTS-100K	Br.-Blk.-Yl. AVC Network
28	470Ω	½	25085	BTS-470	Yl.-Vi.-Br. RF Cathode
29	100KΩ	½	8885	BTS-100K	Br.-Blk.-Yl. AVC Network
30	22KΩ	½	25038	BTS-22K	Red-Red-Or. Oscillator Grid
31	470Ω	½	25085	BTS-470	Yl.-Vi.-Br. IF Cathode
32	22KΩ	2	25721	BT-2-22K	Red-Red-Or. Screen Dropping
33	1 Meg.	½	8766	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
34	470KΩ	½	25042	BTS-470K	Yl.-Vi.-Yl. Diode Load
35	15 Meg.	½	14365	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
36	220KΩ	½	25041	BTS-220K	Red-Red-Yl. AF Plate Load
37	1 Meg.	½	8766	BTS-1 Meg.	Br.-Blk.-Grn. Feedback
38	220KΩ	½	25041	BTS-220K	Red-Red-Yl. Output Grid
39	330Ω	2	25742	BW-2-330	Or.-Or.-Br. Output Cathode
40	2.2 Meg.	½	25134	BTS-2.2 Meg.	Red-Red-Grn. Tone Compensation
41	22KΩ	½	25038	BTS-22K	Red-Red-Or. " "
42	33KΩ	½	25144	BTS-33K	Or.-Or.-Or. " "
43	3.3Ω	½	25536	BW-½-3.3	Or.-Blue-Gold Serial Pilot Light

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
44	117VAC @ .5A	620VCT .062A DC	5.1VAC @ 2.0A	6.4VAC @ 2.0A	25723	P-6120*	T22R02*	P-2951*

*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
45	3300Ω	3.3Ω	240Ω	.25Ω	25713	A-3823	T22S46	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-736#		
46A	800Ω	3.3Ω	25712	Mod. F8-W	8E10#	#Drill and tap magnet frame and shunt field coil with 4000Ω 2W resistor.
B			25114			Alternate speaker.
	CONE DIA.	VC DIA.				
47	7-3/8"	3/4"				

R F COILS

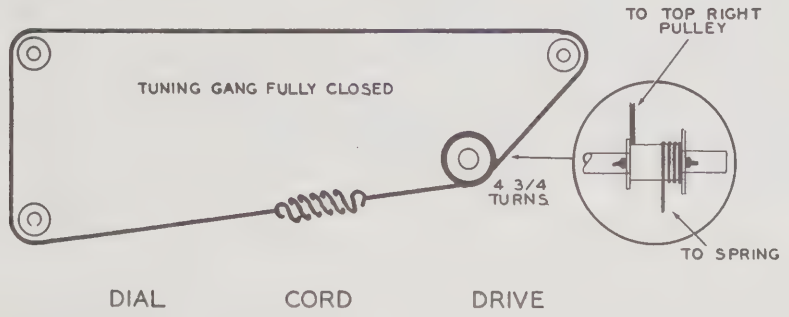
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.
48	Loop Ant.	.1Ω	1Ω	25965	
49	RF Coil	72Ω	6Ω	25597	
50	Osc. Coil		6Ω	25724	14-1060
51	Input IF	28.8Ω	28.8Ω	25715	16-6658
52	Output IF	32Ω		25714	16-6670

DIAL LIGHT

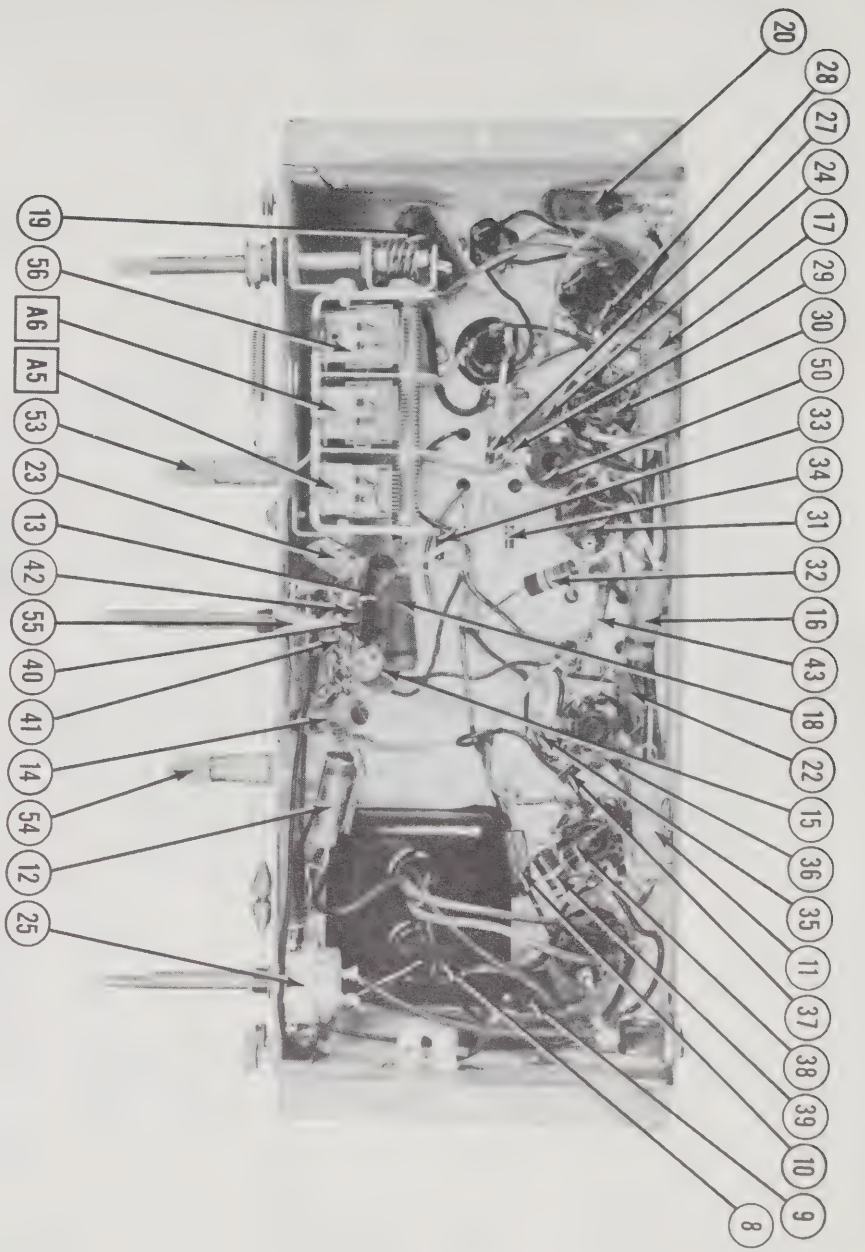
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					AIRLINE PART No.		
53	Bayonet	6-8	0.15	Brown			Type 47
54	"	6-8	0.15	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
55	Switch	25562	Radio-Phono-Tone
56	3 Gang Var. Cap.	25592	(31-427MF, 31-427MF, 33-200MMF)
	Dial Scale	25947	Plastic
	Dial Pointer	25578	



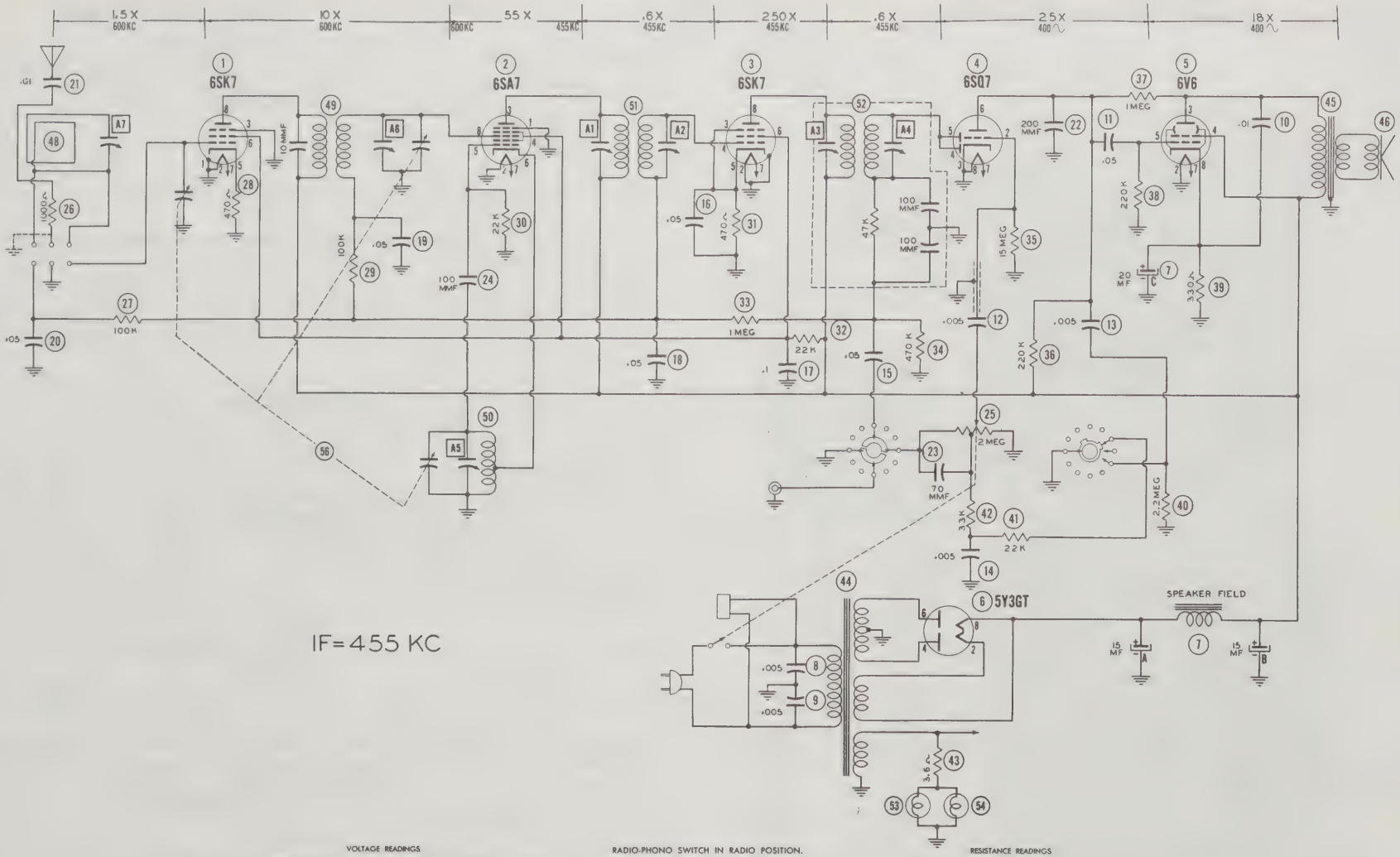
CHASSIS—BOTTOM VIEW



DATE 8/48 #4813-2 SET #42-FOLDER #2

AIRLINE MODEL 74KR-2713A

AIRLINE MODEL 74KR-2713A



VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	0V.	0V.	-.3VDC	2.4VDC	76VDC	6.4VAC	270VDC
2	6SA7	0V.	0V.	270VDC	76VDC	-4.6VDC§	0V.	6.4VAC	-.5VDC
3	6SK7	0V.	0V.	2.4VDC	-.4VDC	2.4VDC	76VDC	6.4VAC	270VDC
4	6SQ7	0V.	-.5VDC	0V.	-.4VDC	-.5VDC	130VDC	6.4VAC	0V.
5	6V6GT	0V.	0V.	252VDC	270VDC	0V.	0V.	6.4VAC	14 5VDC
6	5Y3GT	0V.	324VDC	0V.	310VAC	0V.	310VAC	0V.	320VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	0Ω	0Ω	1.6 Meg.	470Ω	120KΩ	.1Ω	100KΩ
2	6SA7	0Ω	0Ω	100KΩ	120KΩ	22KΩ	.4Ω	.1Ω	1.6 Meg.
3	6SK7	0Ω	0Ω	470KΩ	1.5 Meg.	470Ω	120KΩ	.1Ω	100KΩ
4	6SQ7	0Ω	15 Meg.	0Ω	520KΩ	520KΩ	520KΩ	.1Ω	0Ω
5	6V6GT	0Ω	0Ω	100KΩ	100KΩ	220KΩ	INF.	.1Ω	330Ω
6	5Y3GT	INF.	100KΩ	INF.	170Ω	INF.	180Ω	INF.	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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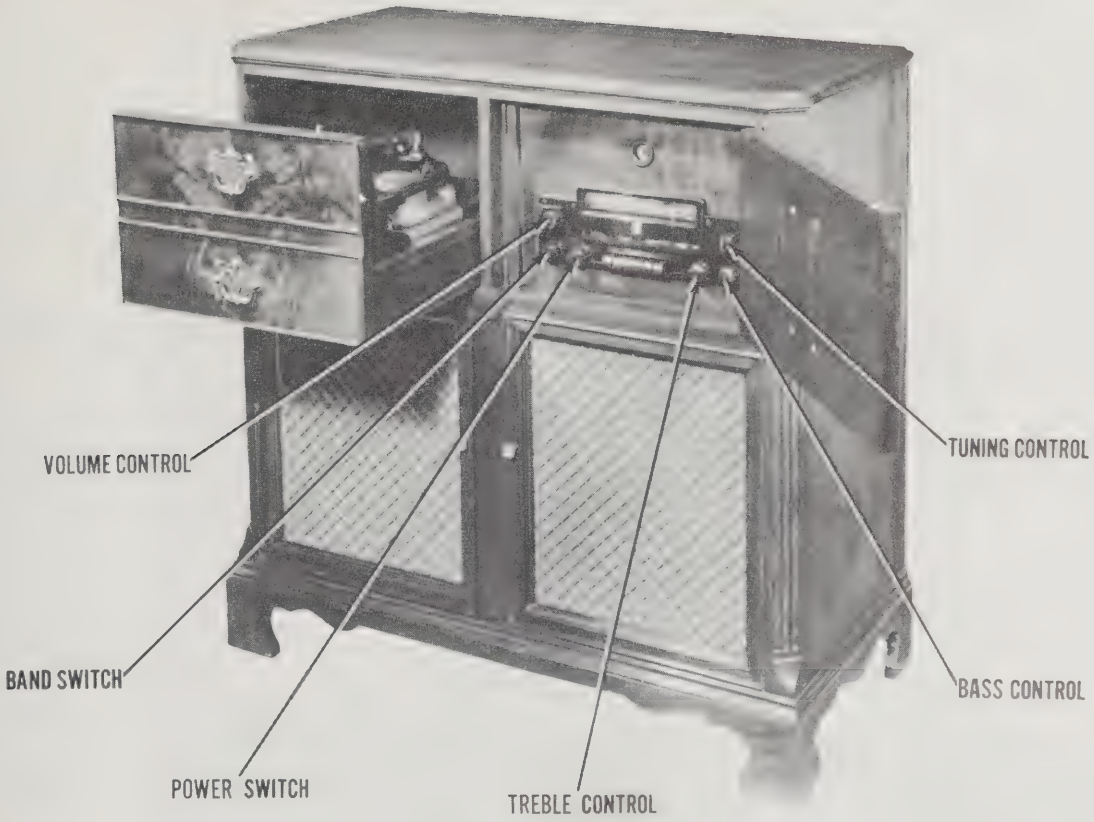
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

AIRLINE MODEL
84WG-2712A



AIRLINE MODEL
84WG-2712A

AIRLINE MODEL 84WG-2712A

TRADE NAME	Airline, Model 84WG-2712A
MANUFACTURER	Montgomery Ward & Co., 619 Chicago Ave. Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band AM-FM Superheterodyne Receiver
TUBES (TWELVE)	Types, 6BA6 RF Amp., 12AT7 FM Converter, 6BE6 AM Converter, 6BA6 1st AM-FM IF Amp., 6BA6 2nd FM IF Amp., 6AL5 FM Ratio Det., 6U5 Tuning Eye, 6AV6 Det.-AVC-AF, 6AV6 Phase Inv., (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING 1.03 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — **SHORT WAVE** 5.8-18MC FREQ. MOD. 88-108MC

PUSHBUTTON ADJUSTMENTS

1. Turn set on and allow to warm up for at least fifteen minutes.
2. Make up a list of stations desired to be set up.
3. Select button for first station to be set up and pull button straight out.
4. Manually tune in station selected.
5. Hold tuning control firmly and push button completely in. This station is now set up.
6. To check accuracy of setting detune manually and retune with button. If setting is off repeat Steps 4 & 5.
7. To set up the remaining buttons follow the procedure outlined above.

DISASSEMBLY INSTRUCTIONS

1. Remove six push-on type control knobs.
2. Remove phono-motor, phono-pickup and speaker plugs from chassis.
3. Remove loop leads from clips on loop antenna.
4. Remove staples holding loop antenna in cabinet and remove loop.
5. Remove black ground lead from rear of chassis.
6. Remove tuning eye from tuning eye bracket.
7. Remove FM antenna leads from terminal strip on chassis.
8. Remove two wood screws from rubber shock mounting brackets. Remove rubber cushions and brackets from cabinet. Remove chassis from cabinet.
9. Remove pilot light from front of cabinet.
10. Remove seven wood screws holding speaker in cabinet. Remove speaker from cabinet.

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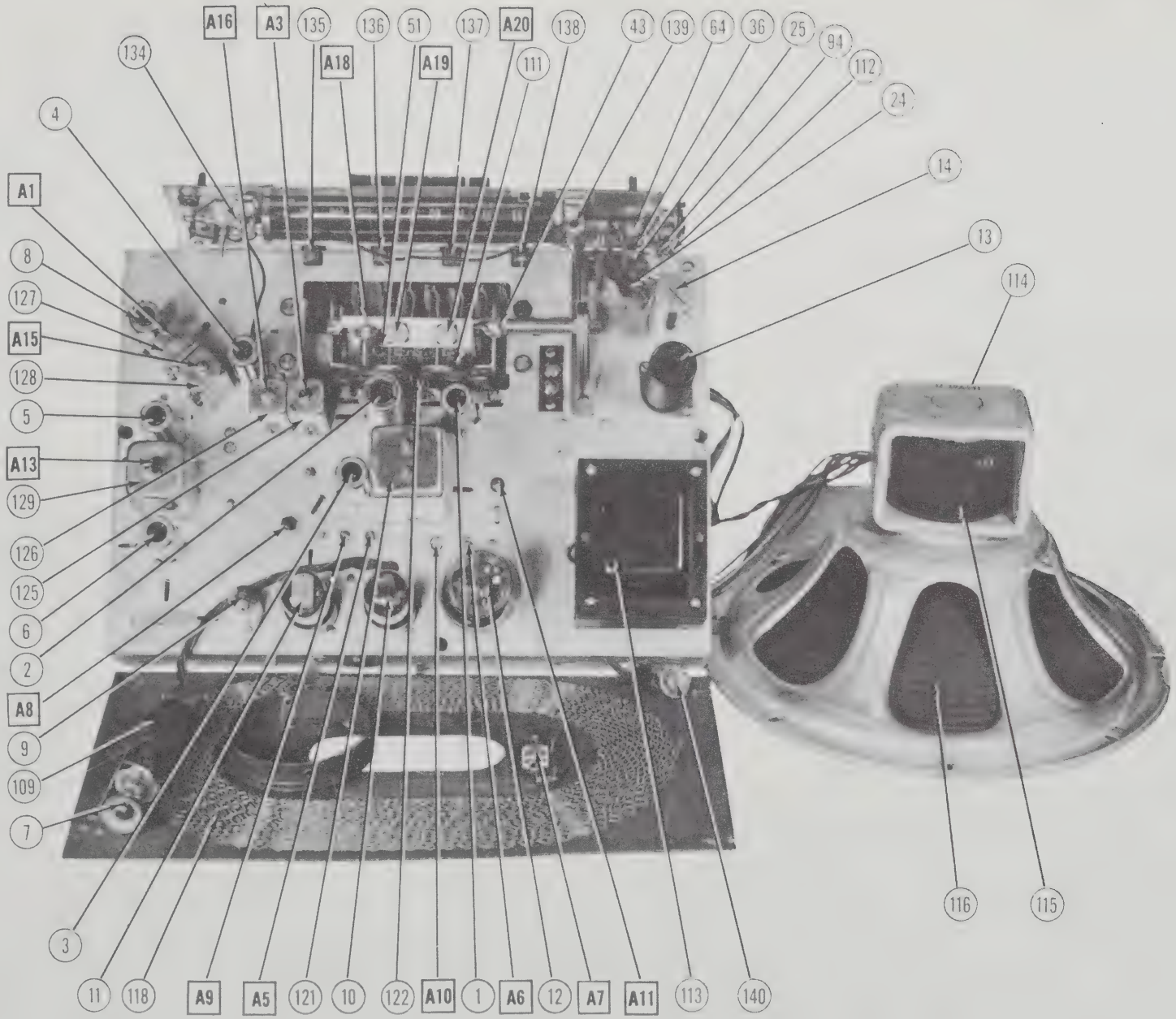
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	FM Converter	12AT7	12AT7		
3	AM Converter	6BE6	6BE6	7CH	
4	1st FM AM IF	6BA6	6BA6	7BK	
5	2nd FM IF	6BA6	6BA6	7BK	
6	FM Ratio Det.	6AL5	6AL5	6NT	
7	Tuning Eye	6U5	6U5	6R	
8	Det.-AVC-AF	6AV6	6AV6		
9	Phase Inv.	6AV6	6AV6		
10	Power Output	6V6GT	6V6GT	7AC	
11	" "	6V6GT	6V6GT	7AC	
12	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
13	20	450	45X351	AF4J	UP2045	DY-20-450	EL-2	Filter
14	40	450	45X302	AF8J	UP4045	DY-40-450	EL-4	"
15	5	100	45X361	PR8150/4	BR415	M-8-150	UT-41	Stabilizing Cap.
16	.002	400	D66202	484-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
17	.002	400	D66202	484-002	DT6D2	ST-6-002	TC-22	" " "
18	.5	100	A66504	484-.5	DT2P5	ST-2-5	TC-5	Bias Filter
19	.5	100	A66504	484-.5	DT2P5	ST-2-5	TC-5	" "
20	.006	400	D66602	484-006	DT6D6	ST-6-006	TC-26	Tone Compensation
21	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
22	.001	600	D66102	684-001	DT6D1	ST-6-001	TC-21	Tone Compensation
23	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
24	.01	200	B66103	484-01	DT2S1	ST-4-01	TC-11	" "
25	.02	200	B66203	484-02	DT2S2	ST-4-02	TC-12	Tone Comp.
26	.01	200	B66103	484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
27	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	1st IF Decoupling
28	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	1st IF Screen Bypass
29	.04	400	D66403	484-04	DT4S4	ST-6-04	TC-14	AM Conv. Decoupling
30	.04	400	D66403	484-04	DT4S4	ST-6-04	TC-14	AM Conv. Screen Bypass
31	.05	200	B66503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
32	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	RF Decoupling
33	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	RF Screen Bypass
34	.00475	160	46X280					Fixed Pad
35	330	500	47X470	1468-00035	5W5T3	MO.5-33	1FM-35	AF Plate Bypass
36	68	300	47X501	1469-00007	5W5Q7	MOS.5-47	MS-47	Tone Compensation-Cer.
37A	50		47X112	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter
B	50			1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
38	2700		47X492	1467-003	1W5D25	MW.5-23	1FM-23	De-emphasis
39	68	300	47X501					Ratio Det. Load Cap.-Cer.
40	68	300	47X501					" " " " "
41	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass Pwr. Supply "
42	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Plate Decoup.-Cer.
43	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Screen Byp. - "
44	5000	500	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Byp. - "
45	500	300	47X496	1468-0005	5W5T5	MO.5-35	1FM-35	1st IF Cathode Byp. - "
46	47	300	47X495	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling - "
47	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. - "
48	47	300	47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Feedback - "
49	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	FM Mixer Plate Decoup.-Cer
50	47	300	47X499	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Coupling - "
51	5	300	47X500	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer - "
52	20	300	47X516		5W5Q2	MOS.5-42	MS-42	RF Coupling - "
53	100		47X497	1468-0001	5W5T1	MO.5-31	1FM-31	" " - "
54	47		47X498	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. - "
55	100		47X497	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling - "
56	20		47X516		5W5Q2	MOS.5-42	MS-42	" " - "
57	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass - "
58	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Decoupling - "
59	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Screen Bypass - "
60	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Cathode Bypass - "
61	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass - "
62	500		47X496	1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling - "
63	270		47X445					Fixed Trimmer - "

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
114	10KΩ CT	9Ω	500Ω CT	.4Ω	Part of 12A481	A-3880#	T-22574#	A-2905#	#Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD RES	VC IMP.		ST-668		
115	710Ω	9Ω	12A481	Mod. F12-Q	12E60	
	CONE DIA.	VC DIA.				
116	11-13/16"	1-1/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: MEISSNER PART No.
117	Loop Ant.	44Ω	1Ω	26A436	
118	Di-pole Ant.			9A1900	
119	Ant. Coil SW	1Ω	0Ω	9A1957	14-1064
120	" " FM	0Ω	0Ω	9A1945	
121A	RF Coil BC	29Ω	5Ω	9A1947	
B	" " SW		0Ω		
122	" " FM		0Ω	9A1946	
123A	Osc. " BC	.6Ω	5Ω	9A1918	
B	" " SW	0Ω	0Ω		
124	" " FM		0Ω	9A1948	
125	1st IF AM	15.5Ω	15.1Ω	9A1934	16-6678
126	" " FM	.2Ω	.2Ω	9A1950	
127	2nd IF AM	14.8Ω	14.8Ω	9A1935	16-6678
128	" " FM	.6Ω	.1Ω	9A1933	
129	Disc. Trans.	.9Ω	.1Ω	9A1936	
130	FM Osc. Plate Chk.		.3Ω	9A1882	
131	FM RF Plate Choke		.1Ω	9A1880	
132	FM Mixer Plate Chk.		.1Ω	9A1880	
133	Fil. Choke Coil		.5Ω	9A1881	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA	INSTALLATION NOTES
134-139	Bayonet	6-8	0.15	Brown	7A103		Type 47
140	"	7.5	0.2	White	7A32		Type 51

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
141	Switch	2A376	On-Off
142	"	2A377	Band
143	Tuning Gang	26A483	(13-473MMF, 13-472MMF, 24-323MMF)
A5 A9	Trimmer Strip	17A246	BC Osc. Adj. / SW Osc. Adj.
A6 A10	Trimmer Strip	17A252	BC RF Adj. / SW RF Adj.
A8	Padder	17A241	BC Osc. Adj.
A11	Trimmer	17A253	SW Ant. Adj.
A18	"	17A255	FM Osc. Adj.
A19 A20	Trimmer Strip	17A247	FM RF Adj. / FM Ant. Adj.
	Dial Pointer	15X221	
	Dial & Drum Assby.	26A484	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	
64A	500KΩ	½	36X374	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 64A per instructions
65A	3 Meg.	½	40X286	D13-140	AM-67-Z	Bass Control
B	Shaft		Not Req.	E	Not Req.	Attach to 65A per instructions
66A	3 Meg.	½	40X286	D13-140	AM-67-Z	Treble Control
B	Shaft		Not Req.	E	Not Req.	Attach to 66A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	
67	68Ω	½	B83680		Blue-Gray-Blk. RF Cathode
68	56KΩ	½	B85563	BTS-56K	Grn.-Blue-Or. RF Screen Dropping
69	22KΩ	1	C85223	BTA-22K	Red-Red-Or. RF Plate Load
70	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
71	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red RF Decoupling
72	100KΩ	½	B84104	BTS-100K	Br.-Blk.-Yl. Mixer Grid
73	10KΩ	½	B84103	BTS-10K	Br.-Blk.-Or. Osc. Grid
74	82Ω	½	B84820		Gray-Red-Or. Parasitic Suppressor
75	2.2 Meg.	½	B85225	BTS-2.2 Meg	Red-Red-Grn. Converter Grid
76	27KΩ	1	C84273	BTA-27K	Red-Vi.-Or. Converter Screen Dropping
77	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red Converter Decoupling
78	22KΩ	½	B84223	BTS-22K	Red-Red-Or. Oscillator Grid
79	2.2 Meg.	½	B85225	BTS-2.2 Meg	Red-Red-Grn. 1st IF Grid
80	68Ω	½	B83680		Blue-Gray-Blk. 1st IF Cathode
81	56KΩ	½	B85563	BTS-56K	Grn.-Blue-Or. 1st IF Screen Dropping
82	1000Ω	½	B85102	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
83	68Ω	½	B83680		Blue-Gray-Blk. 2nd IF Cathode
84	39KΩ	1	C84393	BTA-39K	Or.-White-Or. 2nd IF Screen Dropping
85	2200Ω	½	B85222	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
86	6800Ω	½	B83682	BTS-6800	Blue-Gray-Red Ratio Det. Diode Load
87	6800Ω	½	B83682	BTS-6800	Blue-Gray-Red " " " "
88	27KΩ	½	B84273	BTS-27K	Red-Vi.-Or. De-emphasis
89	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
90	220KΩ	½	B83224	BTS-220K	Red-Red-Yl. AF Plate Load
91	4.7 Meg.	½	B85475	BTS-4.7 Meg	Yl.-Vi.-Grn. AF Grid
92	2.2 Meg.	½	B85225	BTS-2.2 Meg	Red-Red-Grn. Bias Network
93	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Phono Tone Comp.
94	15KΩ	½	B85153	BTS-15K	Br.-Grn.-Or. Tone Comp.
95	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
96	47KΩ	½	B85473	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
97	150KΩ	1	B84154	BTA-150K	Br.-Grn.-Yl. Phase Inv. Grid
98	220KΩ	½	B83224	BTS-220K	Red-Red-Yl. Phase Inv. Plate Load
99	3.3 Meg.	½	B85335	BTS-3.3 Meg	Or.-Or.-Grn. Output Grid
100	2.2 Meg.	½	B85225	BTS-2.2 Meg	Red-Red-Grn. " "
101	220KΩ	½	B83224	BTS-220K	Red-Red-Yl. Bias Network
102	220KΩ	½	B83224	BTS-220K	Red-Red-Yl. " "
103	5.6 Meg.	½	B85565	BTS-5.6 Meg	Grn.-Blue-Grn. Bias Network
104	270KΩ	½	B83274	BTS-270K	Red-Vi.-Yl. Bias Network
105	220KΩ	½	B83224	BTS-220K	Red-Red-Yl. " "
106	120KΩ	½	B83124	BTS-120K	Br.-Red-Yl. " "
107	2.2 Meg.	½	B84225	BTS-2.2 Meg	Red-Red-Grn. Bias Network
108	6.2Ω	1	43X217	BW-1-6.8	Blue-Red-Gold Series Pilot Light
109	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. Tuning Ind. Plate Load
110	22KΩ	½	B84223	BTS-22K	Red-Red-Or. SW Ant. Shunt
111	2200Ω	½	B85225	BTS-2200	Red-Red-Red FM Ant. Shunt
112	100KΩ	½	B84104	BTS-100K	Br.-Blk.-Yl. Tone Comp.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
113	117V AC @ 1.03A	650V CT .132A DC	5.4V AC @ 3.0A	6.5V AC @ 4.2A	53X293	P-6014*	T22R06	P-2954*

*Add series resistor to reduce plate voltage.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1A	6BA6	-.2VDC	0V.	0V.	6.5VAC	245VDC	84VDC	.7VDC	-	-
‡ 1B	6BA6	-.5VDC	0V.	0V.	6.5VAC	240VDC	100VDC	.6VDC	-	-
‡ 2	12AT7	240VDC	-3.5VDC	0V.	0V.	0V.	250VDC	-.6VDC§	0V.	6.3VAC
3	6BE6	-2VDC§	0V.	0V.	6.5VAC	248VDC	81VDC	-.1VDC	-	-
4	6BA6	-.1VDC	0V.	0V.	6.5VAC	238VDC	93VDC	.7VDC	-	-
5	6BA6	0V.	0V.	0V.	6.5VAC	245VDC	82VDC	.9VDC	-	-
‡ 6	6AL5	0V.	0V.	0V.	6.5VAC	.3VDC	0V.	-.3VDC	-	-
8	6AV6	-.7VDC	0V.	0V.	6.5VAC	0V.	-.4VDC	105VDC	-	-
9	6AV6	-.9VDC	0V.	0V.	6.5VAC	0V.	0V.	153VDC	-	-
10	6V6GT	0V.	6.5VAC	250VDC	256VDC	-11.5VDC	-28VDC	0V.	0V.	-
11	6V6GT	0V.	0V.	250VDC	256VDC	-11.5VDC	256VDC	6.5VAC	0V.	-
12	5U4G	0V.	260VDC	0V.	325VAC	0V.	325VAC	0V.	260VDC	-

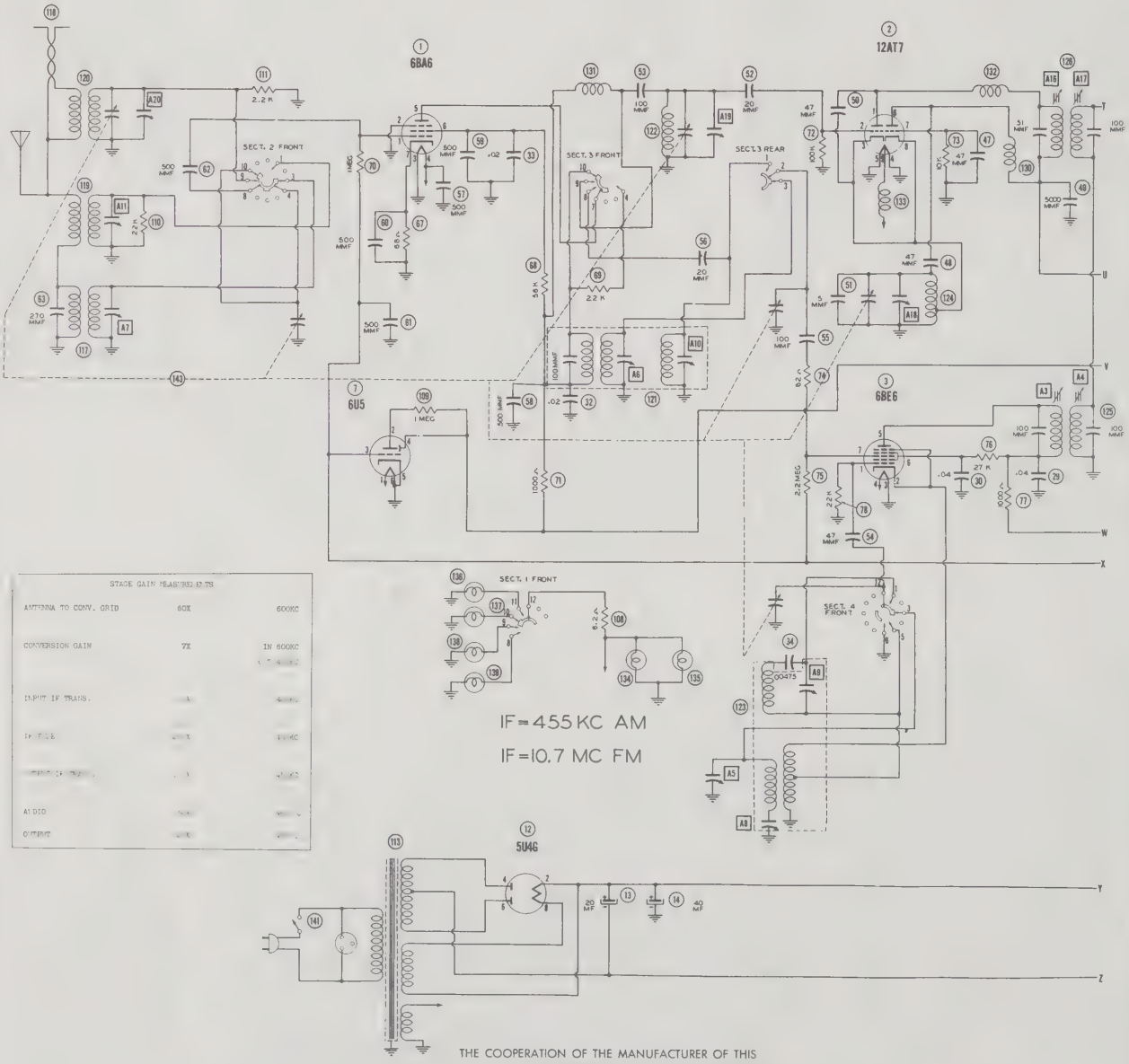
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1A	6BA6	2.5 Meg.	0Ω	0Ω	.05Ω	150KΩ	150KΩ	68Ω	-	-
‡ 1B	6BA6	2 Meg.	0Ω	0Ω	.05Ω	90KΩ	150KΩ	68Ω	-	-
‡ 2	12AT7	90KΩ	100KΩ	0Ω	0Ω	0Ω	90KΩ	10KΩ	0Ω	.05Ω
3	6BE6	22KΩ	.6Ω	0Ω	.05Ω	90KΩ	120KΩ	3.7 Meg.	-	-
4	6BA6	3.7 Meg.	0Ω	0Ω	.05Ω	90KΩ	150KΩ	68Ω	-	-
5	6BA6	.2Ω	0Ω	0Ω	.05Ω	90KΩ	130KΩ	68Ω	-	-
‡ 6	6AL5	INF.	INF.	0Ω	.05Ω	6800Ω	INF.	6800Ω	-	-
8	6AV6	4.7 Meg.	0Ω	0Ω	.05Ω	0Ω	540KΩ	310KΩ	-	-
9	6AV6	150KΩ	0Ω	0Ω	.05Ω	0Ω	0Ω	310KΩ	-	-
10	6V6GT	INF.	.05Ω	90KΩ	90KΩ	270KΩ	2 Meg.	0Ω	0Ω	-
11	6V6GT	INF.	0Ω	90KΩ	90KΩ	260KΩ	90KΩ	.05Ω	0Ω	-
12	5U4G	INF.	90KΩ	INF.	800Ω	INF.	800Ω	INF.	90KΩ	-

VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

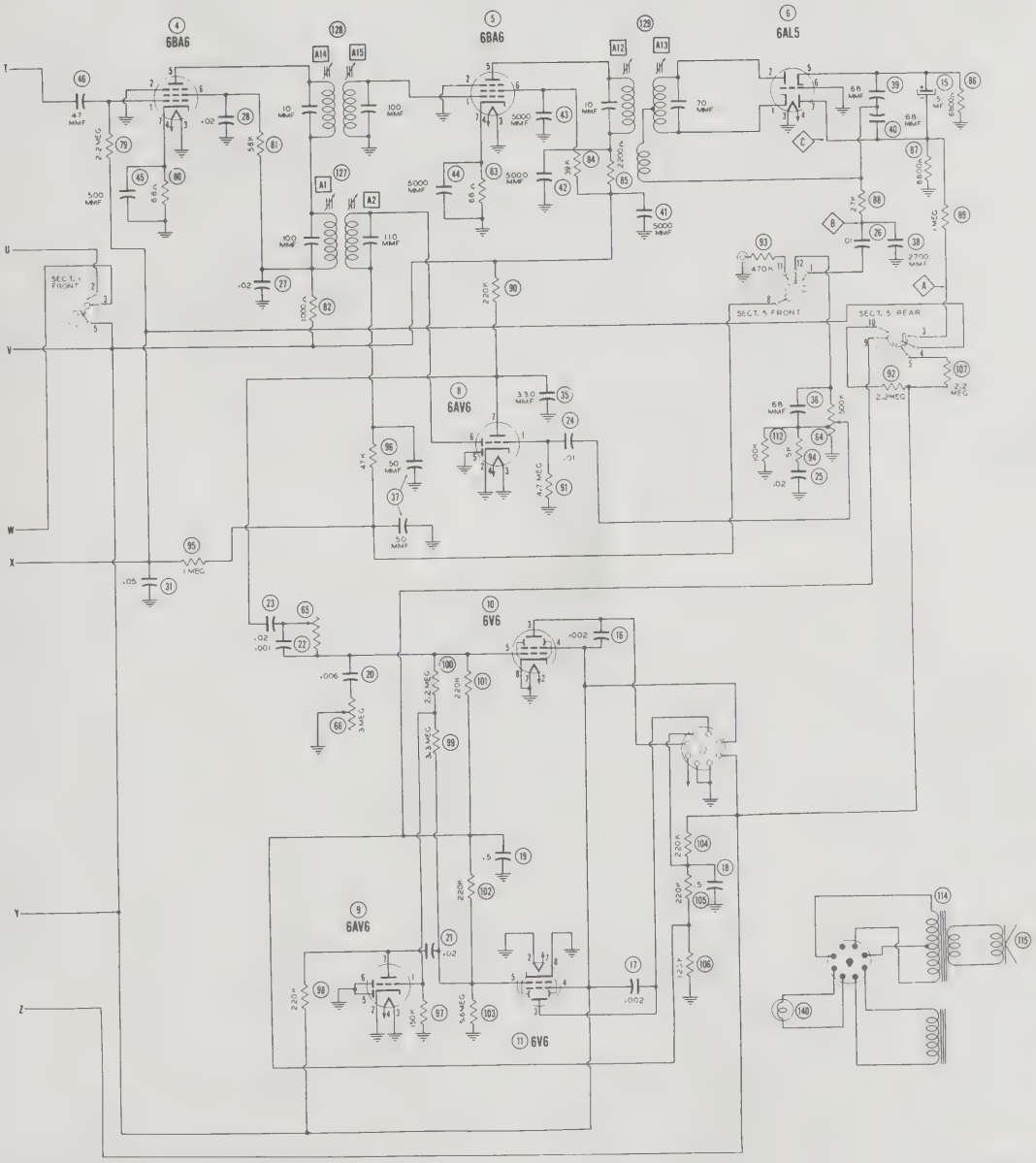


STAGE GAIN MEASUREMENTS		
ANTENNA TO CONV. GRID	60X	600KC
CONVERSION GAIN	7X	IN 600KC
INPUT IF TRANS.	[illegible]	[illegible]
IF DIDE	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
AUDIO OUTPUT	[illegible]	[illegible]

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W Sams & Co., Inc 1948

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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4813-3

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	1620KC	"	"	"	A5	" " " "
3	200MMFD	"	1400KC	"	Tune for maximum output.	"	A6,A7	" " " " Set pointer to 1400KC calibration mark.
4	200MMFD	"	600KC	"	"	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 and 4 until no further improvement can be made.
5	400Ω carbon res.	"	18.3MC	SW	Tuning cap. fully open.	"	A9	Adjust for maximum output
6	"	"	17MC	"	Tune for max. output.	"	A10, A11	Adjust for maximum output

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
	.1 MFD	High side to Pin 1 (grid) of 6BA6 2nd IF Tube (5). Low side to chassis.	10.7MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A12	Adjust for maximum deflection.
8	.01 MFD	"	"	"	"	DC probe to Point (B). Common to chassis	A13	Use zero center scale meter if available. Adjust for zero deflection. Repeat Steps 7 & 8 until no further improvement can be made.
9	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A14, A15	Shunt a 5000Ω resistor across secondary of FM 2nd IF Transformer (128). Adjust A14 for maximum deflection. Transfer resistor to primary of same transformer and adjust A15 for maximum deflection.
10	.01 MFD	High side to center FM stator of tuning cap. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum deflection. Continue with FM RF Alignment in Step 10.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

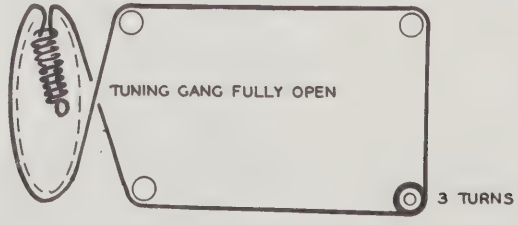
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A12,A14, A15	Disconnect 5 MFD cap. (15) from Point (A). Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
8	.01 MFD	High side to Pin 2 (grid) of 12AT7. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 5 MFD. cap. to Point (A).
9	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A13	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 10.

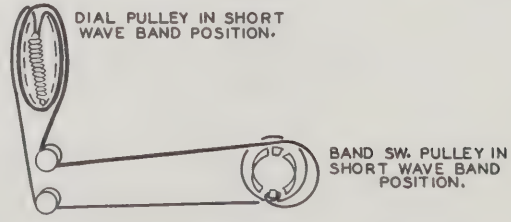
FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10	300Ω carbon res.	High side to rear dipole terminal. Low side to other dipole terminal.	108.4MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A18	Adjust for maximum deflection. Tune sig. gen. to approximately 87MC. If meter deflection is not noted retune sig. gen. to 108.4MC and increase capacity of A18 until next peak is obtained. Adjust for maximum deflection and recheck for image.
11	"	"	104.5MC (Unmodulated)	"	Tune for maximum deflection.	"	A19, A20	Adjust for max. deflection Reinstall receiver in cabinet.
12	200MMFD	High side to ext. ant. lead. Low side to chassis.	1400KC (400∿ Amp. Mod.)	BC.	"		A7	Reconnect output meter across voice coil. Adjust A7 for maximum volume

FIG. 1

FIG. 2





ARVIN MODEL 250-P

TRADE NAME	Arvin, Model 250-P (Ch. RE-248)
MANUFACTURER	Noblitt-Sparks Industries, Columbus, Ind.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 1U4 RF Amp., 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY RATING	110-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .17 Amp. @ 117 Volts AC and 50MA @ 9 Volts DC and 15MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to large stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF to reduce hum modulation.
2	"	"	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3		Loop	1620KC	Tuning cap. fully open.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4		"	1400KC	Tune for maximum output.	"	A7	Rock tuning cap. and adjust for maximum output.
5		"	1000KC	"	"		Bend tuning cap. rotor plates for maximum output.
6		"	600KC	"	"		Bend tuning cap. rotor plates for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made.

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"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 8/48-#4813-4 SET #43-FOLDER #4

ARVIN MODEL 250-P
(Ch. RE-248)

ARVIN MODEL 250-P
(Ch. RE-248)

PARTS LIST AND DESCRIPTIONS

ARVIN MODEL
250-P (Ch. RE-248)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
1	RF Amp.	1U4	1U4	6AR	
2	Converter	1R5	1R5	7AT	
3	IF Amp.	1U4	1U4	6AR	
4	Det.-AVC-AF	1S5	1S5	6AU	
5	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	40	150	A21815	AF84D20A	UP4CJ62	DY-304	EL-351	■ Filter
B	20	150						▲ "
C	100	10						Filament Bypass
7	10	150	A21811	PRS150/12	BR1215	M-10-150	UT-121	Filter
8	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Line Filter
9	.001	600	C20069-102	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
10	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Filament Bypass
11	.02	400	C20068-203	484-02	DT4S2	ST-4-02	TC-12	AF Screen Bypass
12	.1	400	C20068-104	484-1	DT4P1	ST-4-1	TC-1	RF Bypass Pwr. Supply
13	.01	400	C20068-103	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
14	.001	500	C20128-102	684-001	DT6D1	ST-6-001	TC-21	IF Grid Filter
15	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
16	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Filament Bypass
17	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Osc. Coupling
18	.002	600	C20065-202	684-002	DT6D2	ST-6-002	TC-22	Ext. Ant. Isolation
19	.1	400	C20068-104	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
20	25		C20065-250	1468-000025	5W5Q25	M0.5-425	MS-425	Feedback
21	50		C20065-500	1468-00005	5W5Q5	M0.5-45	1FM-45	Diode RF Filter
22	50		C20065-500	1468-00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cap.
23	250		C20065-251	1468-00025	5W5T25	M0.5-325	1FM-325	RF Coupling
24	33		C20065-330	1468-00004	5W5Q4	M0.5-44	1FM-44	Fixed Padder

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	
25A	2 Meg.	½	C21879	D13-139	AM-66-Z	Volume Control
B	Shaft		Not Req.	A&C31†	FS-5	Attach to 25A per instructions
C	Switch		" "	42	SW-A2	" " " " "

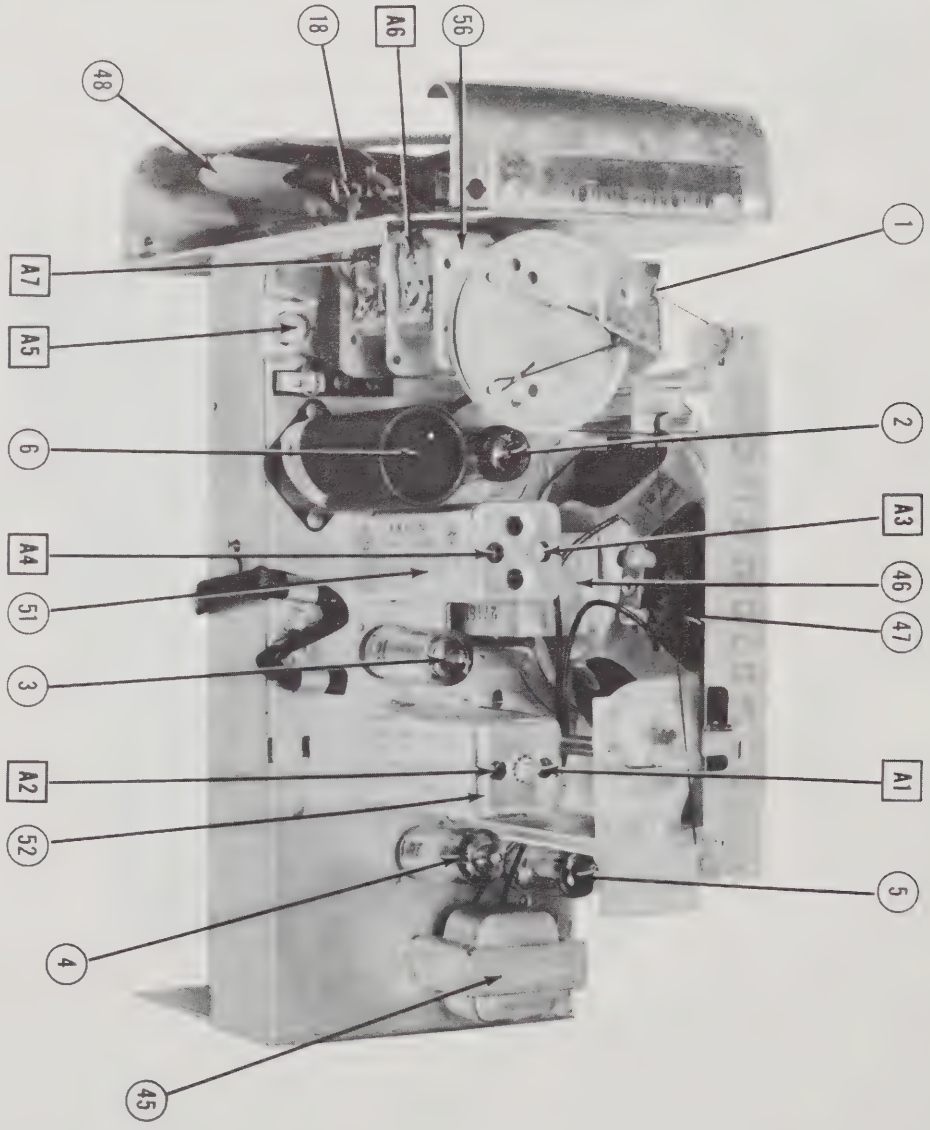
†Use C3 coupler and part of original shaft to duplicate original.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	
26	680Ω	½	C20060-682	BTS-6800	Blue-Gray-Red RF Plate Load
27	100KΩ	½	C20060-104	BTS-100K	Br.-Blk.-Yl. Converter Grid
28	100KΩ	½	C20060-104	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
29	22KΩ	½	C20060-223	BTS-22K	Red-Red-Or. Converter Screen Dropping
30	680Ω	½	C20060-681	BTS-680	Blue-Gray-Br. Filter
31	10 Meg.	½	C20060-106	BTS-10 Meg.	Br.-Blk.-Blue IF Grid
32	3.3 Meg.	½	C20060-335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
33	4.7 Meg.	½	C20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
34	4.7 Meg.	½	C20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen Dropping
35	330KΩ	½	C20060-334	BTS-330K	Or.-Or.-Yl. AF Plate Load
36	2.2 Meg.	½	C20060-225	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
37	3.3 Meg.	½	C20060-335	BTS-3.3 Meg.	Or.-Or.-Grn. Feedback
38	47Ω	1	C20070-470	BW-1-47	Yl.-Vi.-Blk. Surge Limiter
39	1800Ω	1	C20070-182	BTA-1800	Br.-Gray-Red Filter
40	1850Ω	10	A21816	ABA-2000	Filament Dropping-See Note
41	680Ω	½	C20060-681	BTS-680	Blue-Gray-Br. Filament String
42	1000Ω	½	C20060-102	BTS-1000	Br.-Blk.-Red " "
43	680Ω	½	C20060-681	BTS-680	Blue-Gray-Br. " "
44	330KΩ	½	C20060-334	BTS-330K	Or.-Or.-Yl. Line Isolation

Note-On IRC replacement set slider at 1850Ω from one end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
45	8000Ω	3.4Ω	235Ω	.3Ω	AC-21893	A-3848	T22S47	A-2900	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES	VC IMP.		ST-105*		
46A B	PM	3.4Ω	C21037 C21113	Mod. P5-X	5A15*	*Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
47	4-3/4"	1/2"				

R F COILS

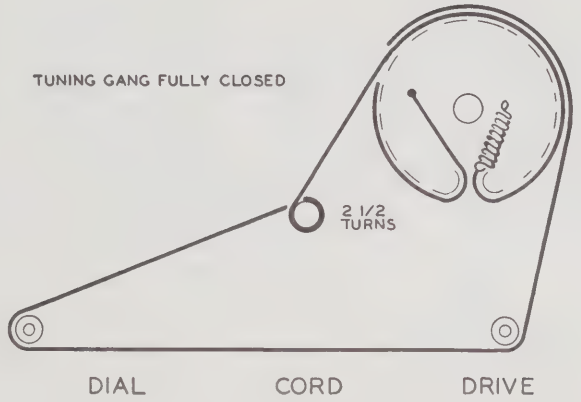
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.
48	Loop Ant.	.1Ω	1.2Ω	AD21054-1	
49	IF TrapCoil		36.2Ω	AC21813-1	
50	Osc. Coil	1.7Ω	7.2Ω	AC21055-1	14-1060
51	Input IF	24Ω	21.2Ω	AC21810-1	16-6666
52	Output IF	23Ω		AC21812-1	16-6670

BATTERIES

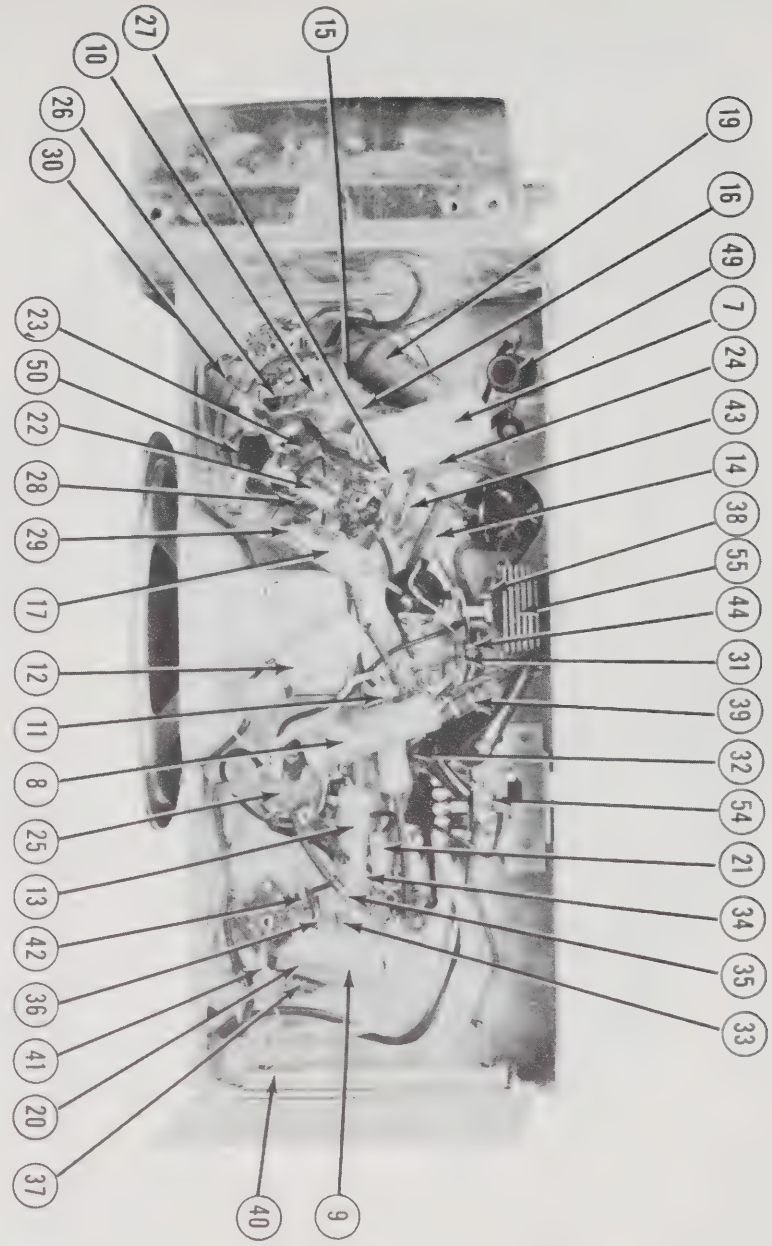
ITEM No.	VOLTAGE	ARVIN PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
53	9V "A" 90V "B"				#753			F6A60	

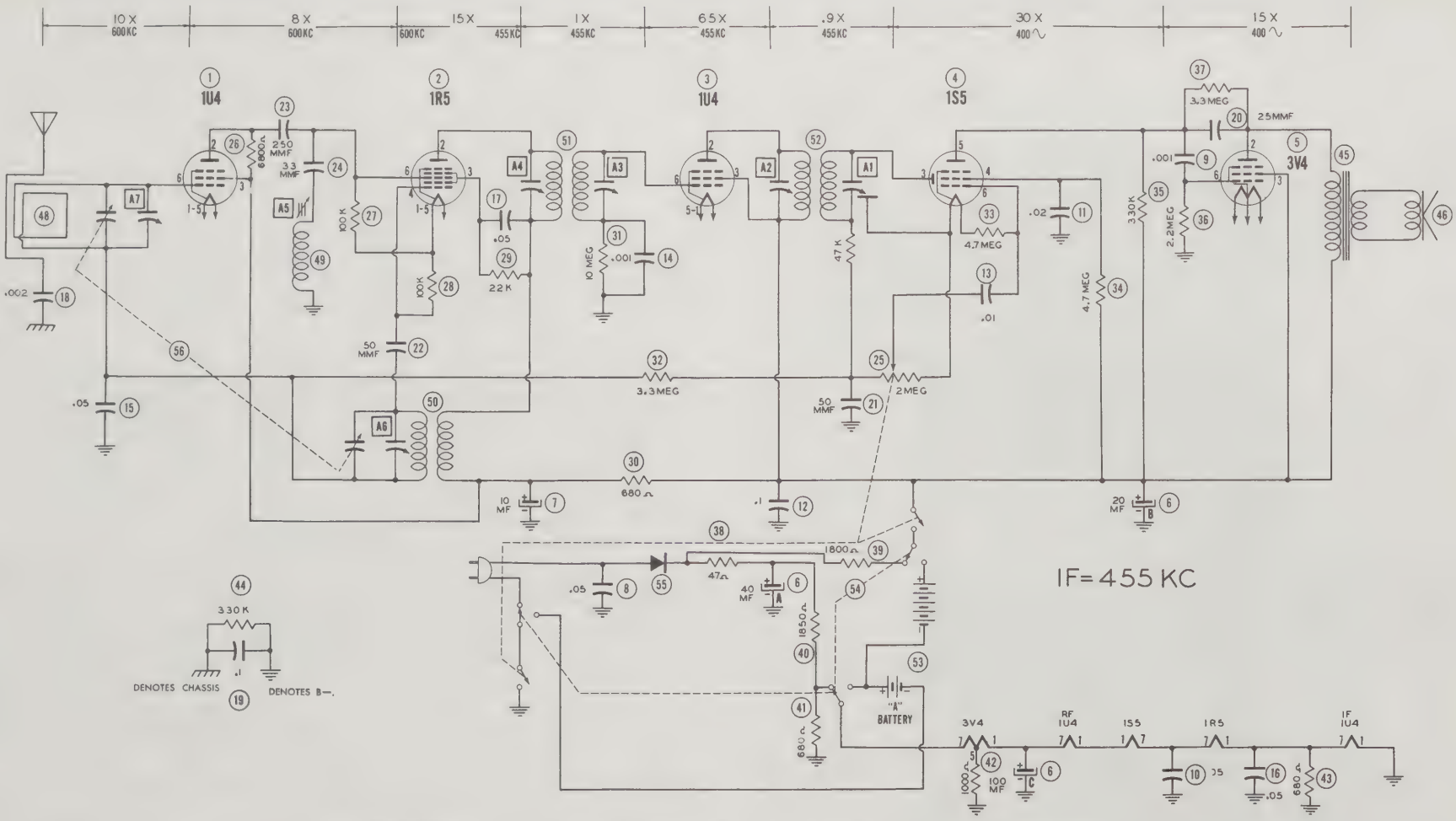
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
54	Switch	A21051	AC/DC-Batt.
55	Rectifier	A20207-1	Selenium 75MA
56	2 Gang Var. Cap.	C19822	(31-496MMF, 27-191MMF
	Dial Scale	C21808	
	Dial Pointer	D21809	
	Indicator	D21196	On-Off



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1U4	4.3VDC	88VDC	95VDC	100VDC	4.3VDC	.2VDC	5.6VDC
2	1R5	1.5VDC	96VDC	56VDC	-11VDC§	1.5VDC	.5VDC	3VDC
3	1U4	0V.	100VDC	100VDC	.2VDC	0V.	0V.	1.5VDC
4	1S5	4.3VDC	0V.	.4VDC	15VDC	46VDC	.1VDC	3VDC
5	3V4	5.6VDC	98VDC	100VDC	0V.	7VDC	0V.	8.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1U4	*	11KΩ	4.3KΩ	3.7KΩ	*	5.2 Meg.	*
2	1R5	*	4.3KΩ	28KΩ	100KΩ	*	100KΩ	*
3	1U4	0Ω	3.7KΩ	3.7KΩ	5 Meg.	0Ω	10 Meg.	*
4	1S5	*	INF.	2 Meg.	4.7 Meg.	330KΩ	4.7 Meg.	*
5	3V4	*	4KΩ	3.7KΩ	0Ω	*	2.2 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to B-.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

BENDIX MODEL 416A
BATTERY OPERATED

BENDIX MODEL 416A
BATTERY OPERATED

BENDIX MODEL 416A

TRADE NAME	Bendix, Model 416A
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Md.
TYPE SET	Battery Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1LA6 Converter, 1LN5 IF Amp., 1LD5 Det.-AVC-AF, 1LB4 Power Output
POWER SUPPLY	1.5 Volt "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	200MA @ 1.5 Volts DC and 12.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are four calibration marks on dial backplate. Reading from left to right they are end limit, 580KC, 965KC & 1475KC. Turn tuning cap. fully closed and set pointer to end limit calibration mark.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to ext. ant. lead. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	200MMFD	"	1475KC	1475KC reference mark.	"	A5	" " " "
3	200MMFD	"	"	Tune for maximum output.	"	A6	" " " "
4	200MMFD	"	965KC	"	"		Check calibration.
5	200MMFD	"	580KC	"	"		Check calibration. If calibration is off more than 10KC tuning cap. rotor plates must be bent to correct calibration If plates are bent repeat Steps 2, 3, 4 and 5 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		BENDIX PART No.	STANDARD REPLACEMENT		
1	Converter	1LA6	1LA6	7AK	
2	IF Amp.	1LN5	1LN5	7AQ	
3	AF Amp.	1LD5	1LD5	6AX	
4	Power Output	1LB4	1LB4	5AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	16	150	CE1E00	PRS150/6	BR1615	M-16-150	UT-161	Filter
6	.001	200	CP2T10	484-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
7	.01	400	CP2T31	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
8	.1	200	CP2T51	484-.1	DT2P1	ST-2-1	TC-1	AF Screen Bypass
9	.005	600	CP2T18	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.05	200	CP2T40	484-05	DT2S5	ST-4-05	TC-15	IF Grid Filter
11	.05	200	CP2T40	484-05	DT2S5	ST-4-05	TC-15	Conv. Screen Bypass
12	.05	200	CP2T40	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
13	100	500	CM5A22	1468-0001	5W5T1	M0.5-31	1FM-31	AF Plate Bypass
14	47	500	CM5A14	1468-00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cap.
15	5100	500	CM3E15					Fixed Pad
16	3.3	300	CC9A16					RF Coupling-Cer.
36	3.3	300	CC9A16					Fixed Trimmer-See Note

Note-Not used in all models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	RV4S06	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	42	SW-A2	" " " " "

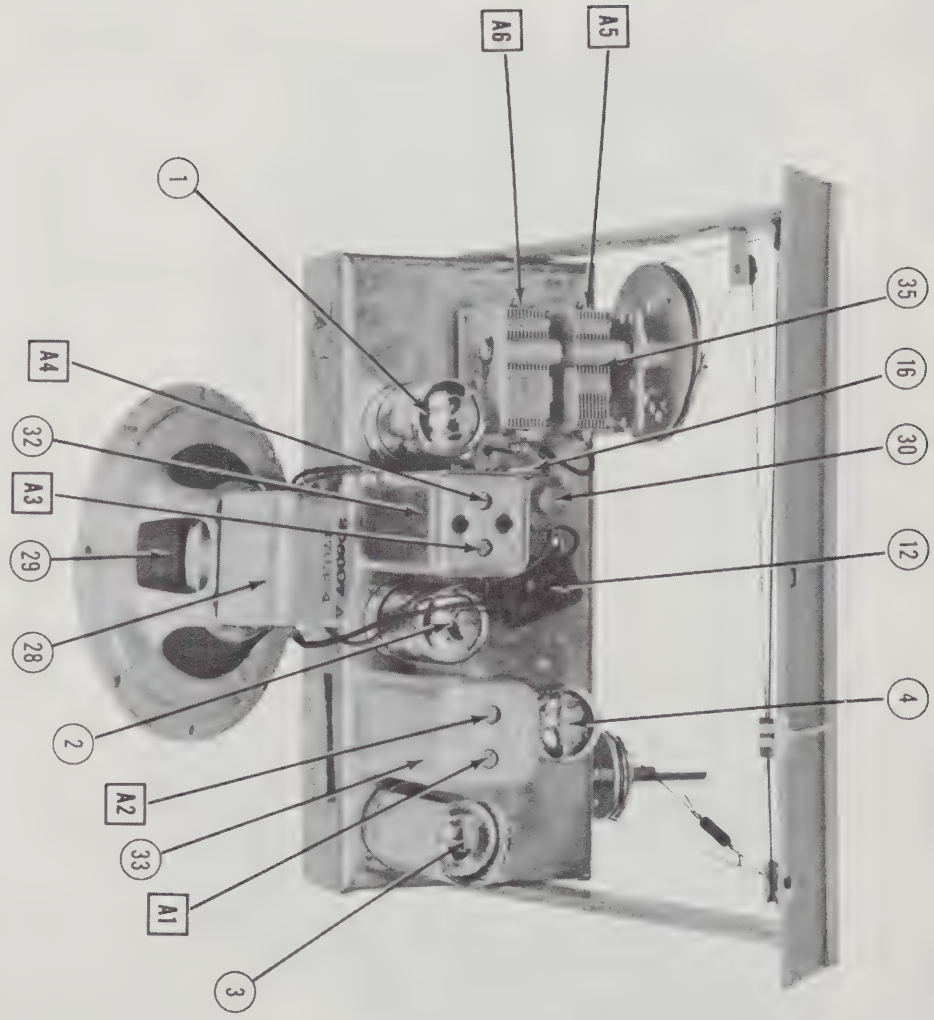
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	
18	220KΩ	¼	RC1H54	BTS-220K	Red-Red-Yl. Oscillator Grid
19	33KΩ	¼	RC1H42	BTS-33K	Or.-Or.-Or. Converter Screen Dropping
20	3.3 Meg.	¼	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. IF Grid
21	3.3 Meg.	¼	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
22	4.7 Meg.	¼	RC1H70	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
23	3.3 Meg.	¼	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
24	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
25	2.2 Meg.	¼	RC1H66	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
26	560Ω	¼	RC1G21	BTS-560	Grn.-Blue-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BENDIX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
27	12KΩ	3.6Ω	700Ω	.6Ω	TA0006	A-3848*	T22S48*	A-2699*	*Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: BENDIX PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
28	FIELD PM	VC IMP. 3.6Ω	SP5R01	ST-105 Mod. P5-X	5A15	
29	CONE DIA. 4-13/16"	VC DIA. 1/2"				

R F COILS

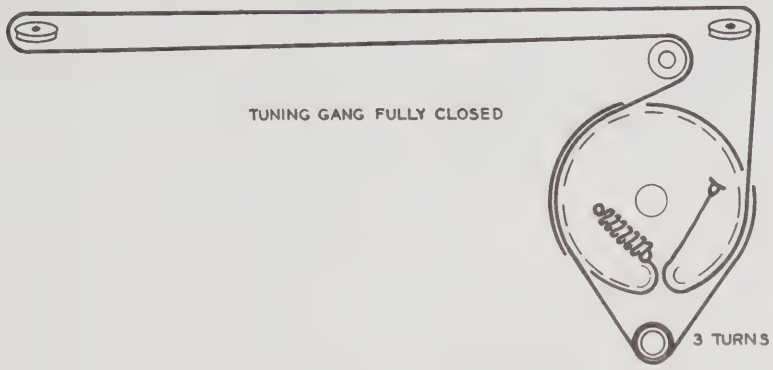
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: BENDIX PART No.	MEISSNER PART No.	
30	Ant. Coil	40Ω	1.3Ω	TR4B00	14-1056	
31	Osc. Coil	1.8Ω	5.2Ω	L04B00		
32	Input IF	25.3Ω	31.3Ω	T10C05		
33	Output IF	21Ω .2Ω‡		T10D06		‡Tertiary Winding

BATTERIES

ITEM No.	VOLTAGE	BENDIX PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
34	1.5V "A" 90 V "B"	AB200			#758			17GD60	

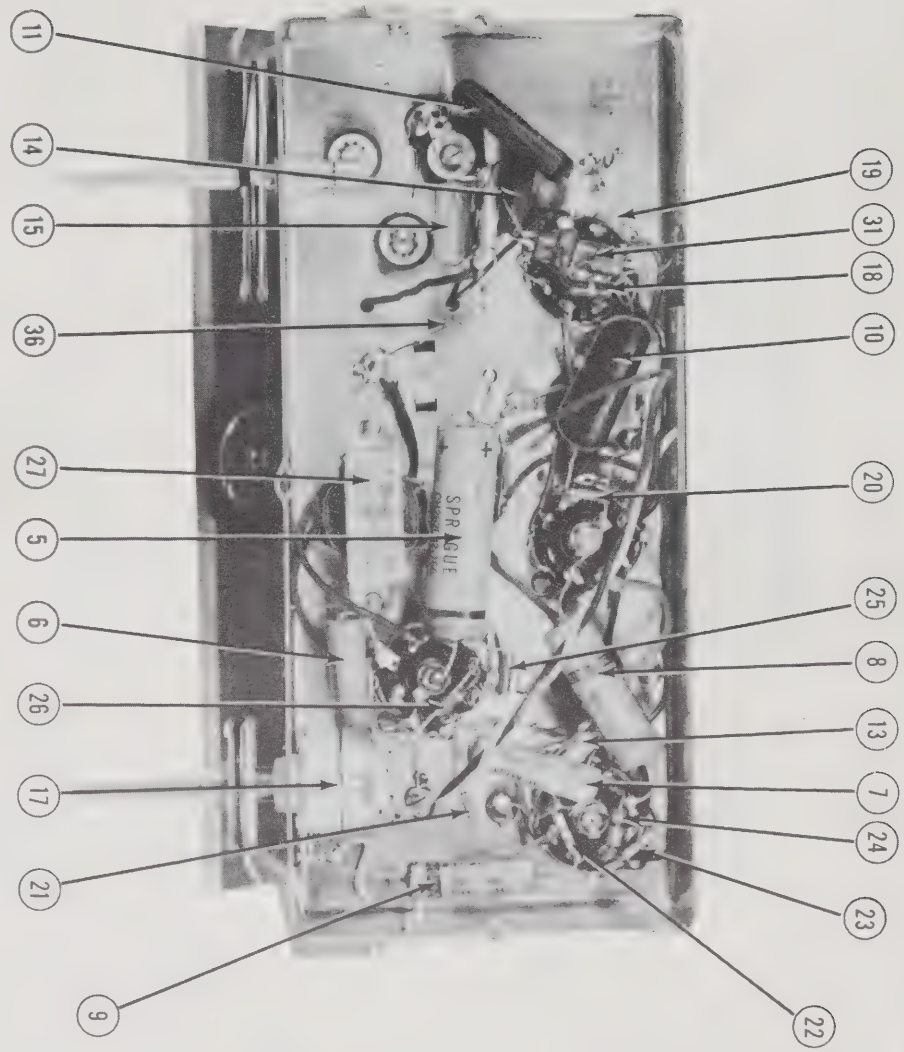
MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
35	2 Gang Var. Cap.	CV0302	(30-473MMF) (30-215MMF)
	Dial Pointer	ID0M09	
	Dial	DS0A10	
	Cabinet	ZW4A00	

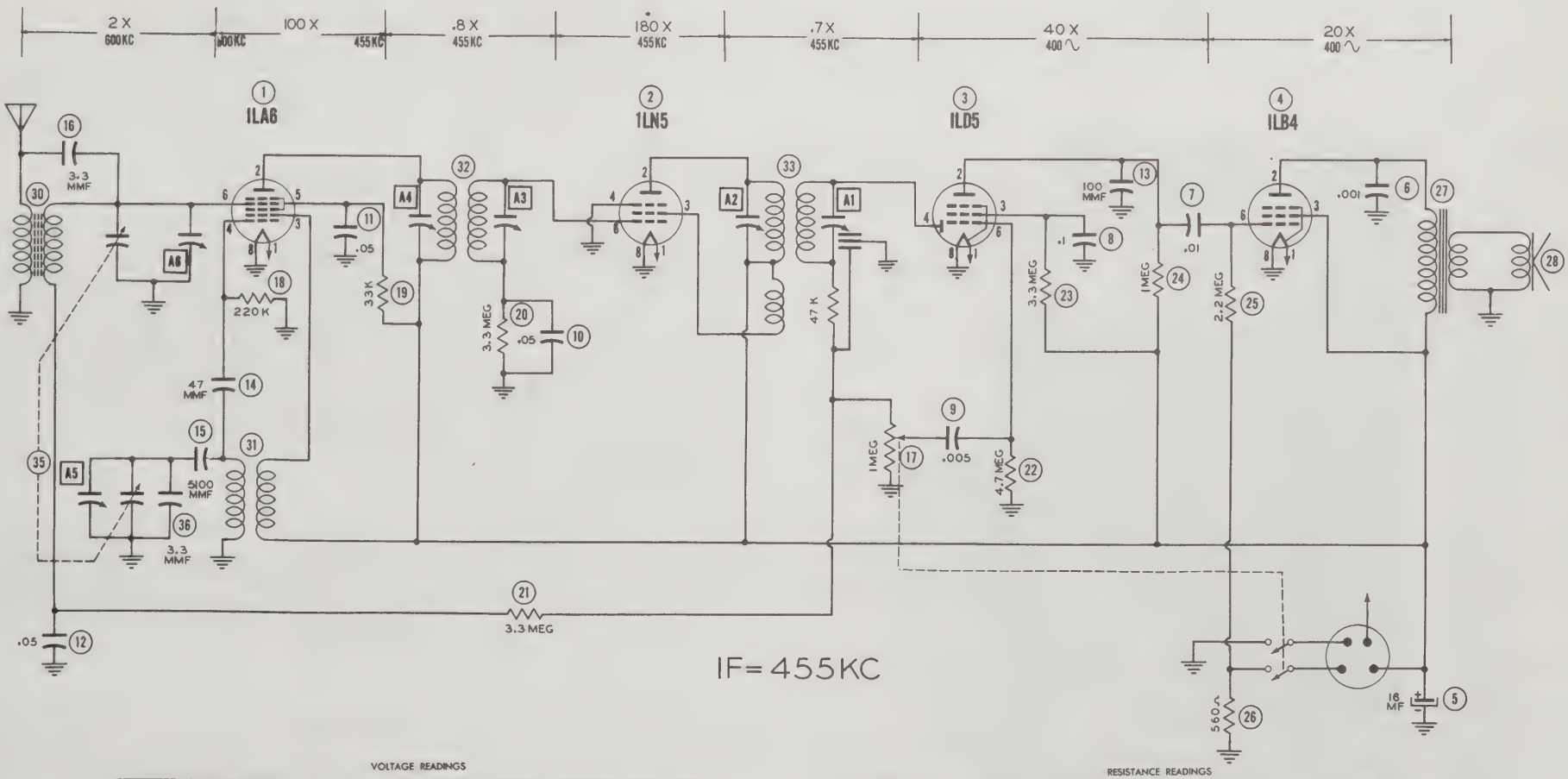


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



BENDIX MODEL 416A



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1LA6	1.5VDC	83VDC	83VDC	$-6.8VDC	52VDC	0V.	83VDC	0V.
2	1LN5	1.5VDC	83VDC	83VDC	0V.	0V.	0V.	0V.	0V.
3	1LD5	1.5VDC	16VDC	16VDC	-.2VDC	83VDC	0V.	-.2VDC	0V.
4	1LB4	1.5VDC	80VDC	83VDC	0V.	-7VDC	-.8VDC	0V.	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1LA6	*	50KΩ	50KΩ	220KΩ	85KΩ	4.3 Meg.	50KΩ	0Ω
2	1LN5	*	50KΩ	50KΩ	0Ω	INF.	3.3 Meg.	3.3 Meg.	0Ω
3	1LD6	*	1 Meg.	3.3 Meg.	1 Meg.	50KΩ	4.7 Meg.	1 Meg.	0Ω
4	1LB4	*	50KΩ	50KΩ	INF.	560Ω	2.2 Meg.	4.3 Meg.	0Ω

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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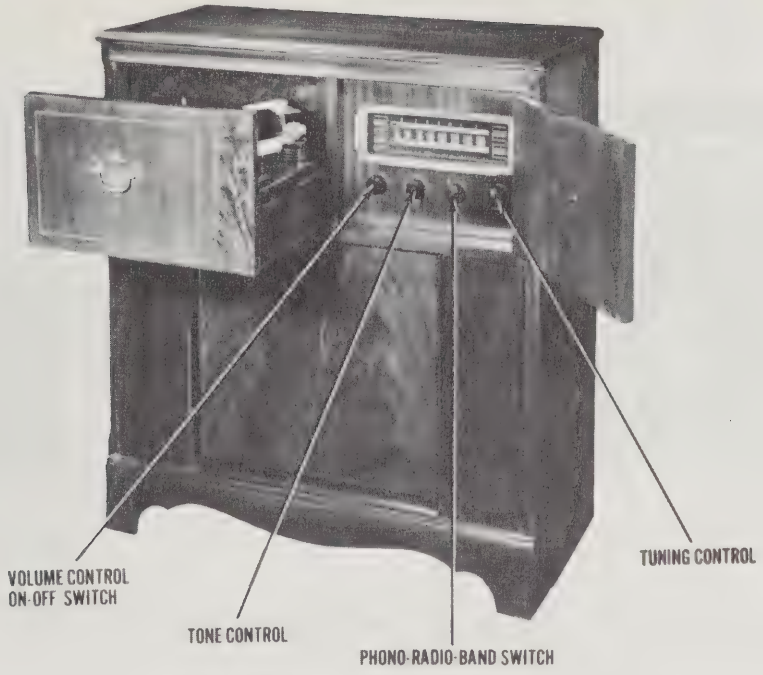
4813-5

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

BENDIX MODELS
1531, 1533



BENDIX MODELS
1531, 1533

TRADE NAME	Bendix, Models 1531, 1533
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Md.
TYPE SET	AC Operated Combination Phono-Radio 2 Band Superheterodyne Receiver
TUBES (SIX)	Types, 7B7 RF Amp., 7A8 Converter, 7B7 IF Amp., 7C6 Det.-AVC-AF, 7C5 Power Output, 7Y4 Rectifier.
POWER SUPPLY	105-125 Volts AC — **RATING** .40 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC — **SHORT WAVE** 6-12MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are reference marks on the lower edge of dial backplate. These are in two rows: top row for SW at end limit, 6MC, 9MC & 11MC; Lower row for BC at end limit, 580KC, 965KC and 1475KC. To set pointer turn tuning cap. fully closed and set pointer to end limit mark.

Loop must be connected during RF Alignment in Steps 2 through 8. IF loop is disconnected a 43 microhenry choke must be connected across loop input.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to ext. antenna terminal. Low side to chassis.	455KC	BC (fully counter clockwise)	Tuning cap.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output
2	50 MMFD (See pre-alignment notes.)	"	580KC	"	580KC reference mark.	"	A5	" " " "
3	"	"	1475KC	"	1475KC reference mark.	"	A6	" " " "
4	"	"	"	"	Tune for maximum output.	"	A7,A8	Adjust for maximum output Repeat Steps 2, 3 & 4 until no further improvement can be made.
5	"	"	965KC	"	"	"		Check calibration.
6	"	"	580KC	"	"	"		Check calibration. If calibration is not within reasonable limits tuning cap. rotor plates must be bent. If rotor plates are bent Steps 2 thru 6 must be repeated until no further improvement can be made.
7	"	"	11MC	SW (center position)	11MC reference mark.	"	A9	Adjust for maximum output
8	"	"	"	"	Tune for maximum output.	"	A10	" " " "

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PARTS LIST AND DESCRIPTIONS

BENDIX MODELS 1531, 1533

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7B7	7B7	8V	
2	Converter	7A8	7A8	8U	
3	IF Amp.	7B7	7B7	8V	
4	Det.-AVC-AF	7C6	7C6	8W	
5	Power Output	7C5	7C5	6AA	
6	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	150	CE3A03	AF4444J*	UP222245*	DY-4x20-450*	EL-420*	● Filter
B	40	150						▲ "
C	20	150						■ "
8	25	25	CE1T00	PRS25/25	BR252A	M-25-25	TA-25	Cathode Bypass
9	.005	600	CP6T18	684-005	DT6D5	MPH-6-005	TC-25	Line Filter
10	.005	600	CP6T18	684-005	DT6D5	MPH-6-005	TC-25	" "
11	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
12	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	Audio Coupling
13	.01	400	CP4T31	464-01	DT4S1	ST-4-01	TC-11	Tone Compensation
14	.006	600	CP6T18	684-006	DT6D6	ST-6-006	TC-22	" "
15	.05	200	CP2T4	484-05	DT2S5	ST-4-05	TC-15	Bias Filter
16	.03	400	CP4T33	464-03	DT4S3	ST-4-03	TC-13	Audio Coupling
17	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	" "
18	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	AF Plate Decoupling
19	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
20	.01	400	CP4T31	464-01	DT4S1	ST-4-01	TC-11	IF Screen Bypass
21	.05	200	CP2T40	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
22	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	Screen Bypass
23	.05	200	CP2T40	484-05	DT2S5	ST-4-05	TC-15	Conv. Cathode Bypass
24	220	500	CM5A30	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
25	100	300	CC6A34	1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
26	220	500	CM5A30	1468-0002	5W5T2	MO.5-32	1FM-32	Osc. Feedback
27	100	300	CM5A22	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
28	47	500	CM5A14	1468-00005	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer
29	220	500	CM5A30	1468-0002	5W5T2	MO.5-32	1FM-32	RF Coupling

*Parallel sections to obtain desired capacity.

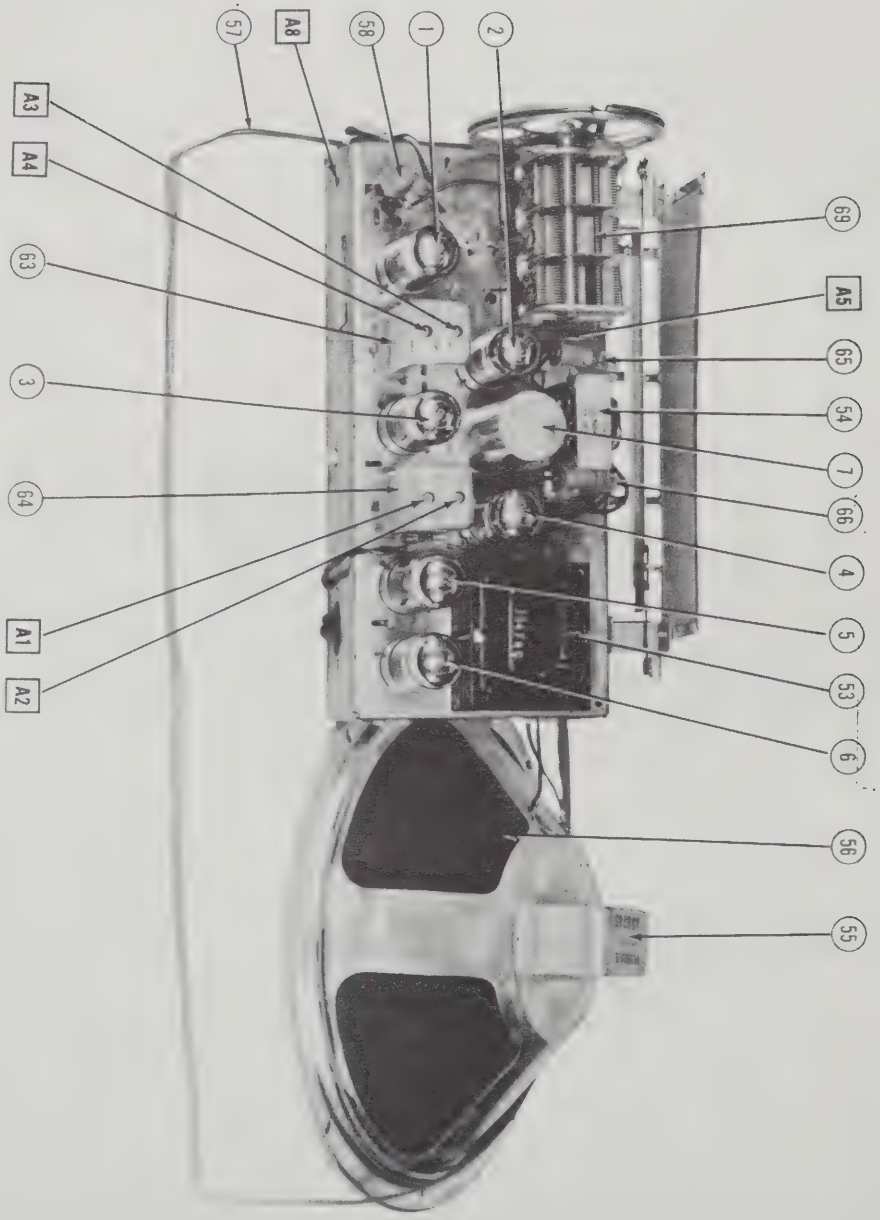
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
30A	2 Meg.	½	RV4S10	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 30A per instructions
C	Switch		" "	41	SW-A	" " " " "
31A	4 Meg.	½	RV4C00	D11-141	M-68-Z	Tone Control-early production
B	Shaft		Not Req.	A	Not Req.	Attach to 31A per instructions
31A	10 Meg.	½		D11-143	M-69-Z	Tone Control-later production
B	Shaft			A	Not Req.	Attach to 31A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BENDIX PART No.	IRC PART No.	IDENTIFICATION CODES
32	47K	¼	RC1H56	BTS-47K	Grn.-Blk.-Yl. RF Grid
33	33K	¼	RC1H38		Or.-Or.-Or. Converter Cathode
34	47K	¼	RC1H44	BTS-47K	Yl.-Yl.-Or. Oscillator Cathode
35	47K	1	RC3H56	BTA-47K	Yl.-Yl.-Or. Screen Dropping
36	22K	1	RC3H50	BTA-22K	Red-Red-Or. Oscillator Plate Load
37	220K	¼	RC1H54	BTS-220K	Red-Red-Yl. IF Screen Dropping
38	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	
39	1 Meg.	½	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. " "
40	2.2 Meg.	½	RC1H66	BTS-2.2 Meg.	Red-Red-Grn. " "
41	1 Meg.	½	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Phono Shunt
42	500KΩ	½	RC1H58	BTS-470K	Grn.-Blk.-Yl. Diode Load
43	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. Tone Compensation
44	10 Meg.	½	RC1H74	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
45	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. AF Plate Load
46	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. AF Plate Decoupling
47	500KΩ	½	RC1H58	BTS-470K	Grn.-Blk.-Yl. Output Grid
48	330Ω	1	RC3H18	BW-1-330	Or.-Or.-Br. Output Cathode
49	3300Ω	2	RC4B33	BT-2-3300	Or.-Or.-Red Filter
50	220Ω	2	RC4D16	BW-2-220	Red-Red-Br. "
51	68Ω	1	RC3H10	BW-1-68	Blue-Gray-Blk. Bias
52	1500Ω	½	RC1H26	BTS-1500	Br.-Grn.-Red Antenna Loading

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BENDIX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
53	117V AC @ .4A	600V CT .058A DC	6.5V AC @ 2.0A		LH-265044-1	P-6115	T22R02	P-2051#

#Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BENDIX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
54	8500Ω	3.5Ω	550Ω	.4Ω	LH-265043	A-3823‡	T22S37	A-2901	‡Drill new mtg. holes.

SPEAKER

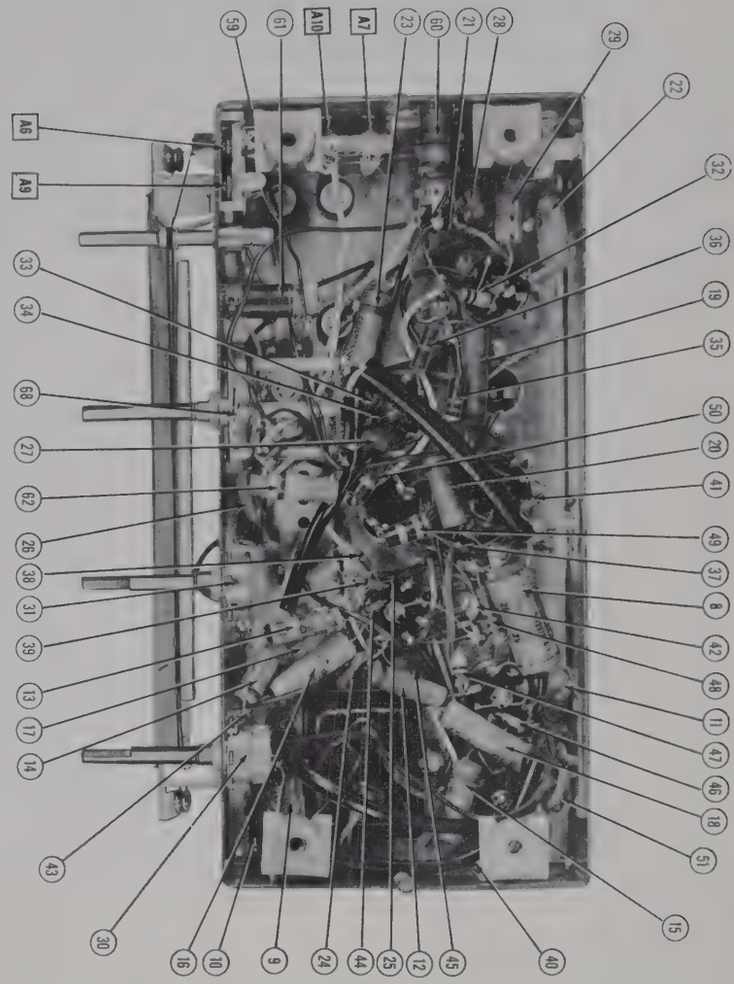
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			BENDIX PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-102†		†Replace out transformer to match 6-8Ω voice coil.
55	PM	3.9Ω	NH256018-2	Mod. P12-S	12A4†	
	CONE DIA.	VC DIA.				
56	11-3/8"	1"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	BENDIX PART No.	MEISSNER PART No.	
57	Loop Ant.		.8Ω			
58	BC Loop Load. Coil		.7Ω	LA0B00		
59	SW Loop Load. Coil		.1Ω	LA0C00		
60	BC RF Coil	6Ω	3.6Ω	TR6L07		
61	BC Osc.Coil		7.8Ω	L06B03	14-1060	
62	SW " "		.5Ω	L06C00		
63	Input IF	22.5Ω	22.5Ω	T10C02	16-6658	
64	Output IF	20.3Ω		T10D13	16-6670	

DATE 8/48-#4813-6 SET #43-FOLDER #6

CHASSIS—BOTTOM VIEW



BENDIX MODELS 1531, 1535

BENDIX MODELS 1531, 1535

PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					BENDIX PART No.		
65	Candelabra	6-8	0.25	Blue	#44		Type 44
66	"	6-8	0.25	"	#44		" "

PHONO CARTRIDGE

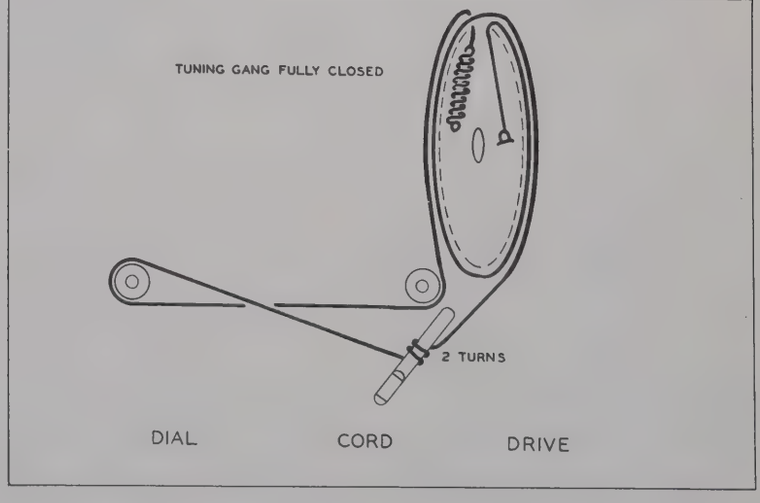
ITEM No.	REPLACEMENT DATA		REMARKS
	BENDIX PART No.	ASTATIC PART No.	
67		L-70-A	L-70-S Original Part

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
68	Switch	SR3E01	Band-Phono
69	3 Gang Var. Cap.	CV0C06	(15-527 MMF) each section
A5	Pauder	CT1A11	BC Osc. Adj.
A6 } A9	Trimmer Strip	CT2A07	{BC Osc. Adj. SW Osc. Adj.
A7 } A10	Trimmer Strip	CT2A08	{BC RF Adj. SW Ant. Adj.
A8	Trimmer	CT1A16	BC Ant. Adj.
	Dial Pointer	ID0M13	
	Dial Scale	DS0C06	Model 1531
	" "	DS0C08	Model 1533

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove two hex head wood screws holding the two terminal antenna board to cabinet.
3. Remove one of the hex head wood screws from corner of loop antenna.
4. Remove phono-pickup plug from chassis.
5. Remove phono motor plug from chassis.
6. Disconnect speaker leads.
7. Remove four hex head bolts holding chassis in cabinet. Remove chassis and loop from cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



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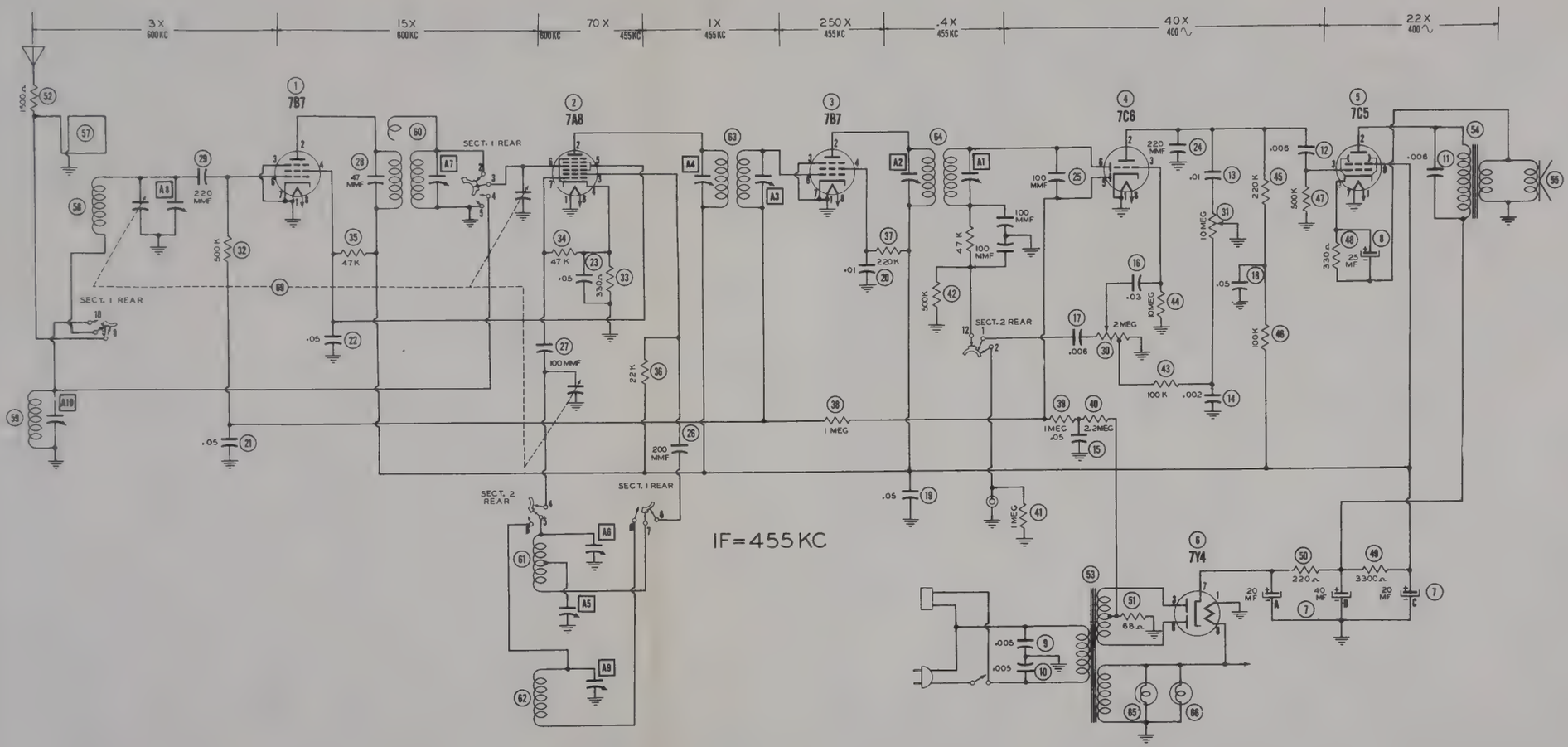

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B7	0V.	240VDC	70VDC	0V.	0V.	-.3VDC	0V.	6.5VAC
2	7A8	0V.	240VDC	175VDC	-17VDC§	70VDC	0V.	2.5VDC	6.5VAC
3	7B7	0V.	240VDC	75VDC	0V.	0V.	-.2VDC	0V.	6.5VAC
4	7C6	0V.	120VDC	-.6VDC	0V.	-.5VDC	-.5VDC	0V.	6.5VAC
5	7C5	0V.	300VDC	240VDC	200VDC	0V.	0V.	135VDC	6.5VAC
6	7Y4	0V.	-4.2VDC	300VAC	-.4VDC	0V.	300VAC	330VDC	6.5VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B7	0Ω	64KΩ	110KΩ	0Ω	0Ω	4.7 Meg	0Ω	.1Ω
2	7A8	0Ω	64KΩ	86KΩ	47KΩ	110KΩ	3.6Ω	330Ω	.1Ω
3	7B7	0Ω	64KΩ	2c0KΩ	0Ω	0Ω	4.2 Meg	0Ω	.1Ω
4	7C6	0Ω	360KΩ	10 Meg.	0Ω	3.2 Meg	540KΩ	0Ω	.1Ω
5	7C5	0Ω	60KΩ	64KΩ	160KΩ	0Ω	500KΩ	330Ω	.1Ω
6	7Y4	0Ω	68Ω	260Ω	2.2 Meg	INF.	42Ω	60KΩ	.1Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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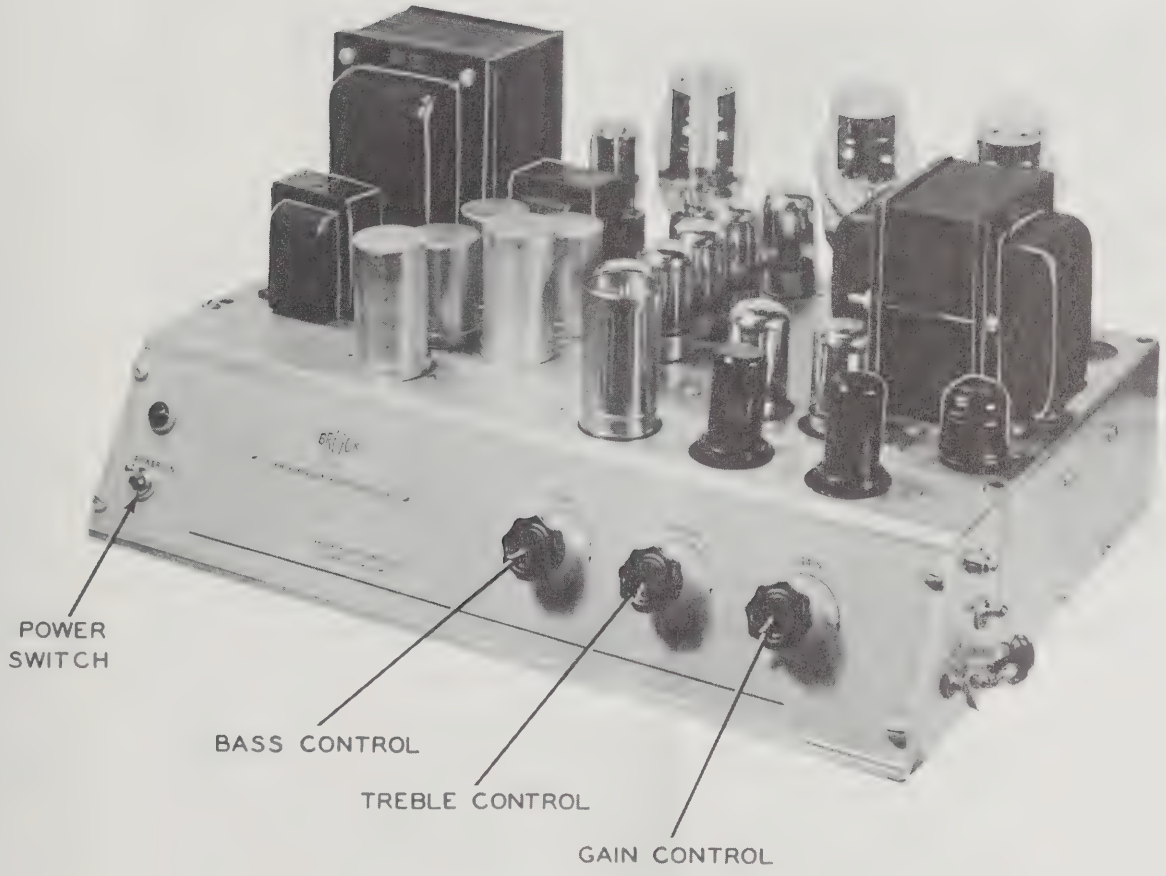
BROOK MODEL
10C2-A



BROOK MODEL
10C2-A

BROOK MODEL 10C2-A

TRADE NAME	Brook, Model 10C2-A
MANUFACTURER	Brook Electronics Inc., 34 DeHart Place, Elizabeth, N.J.
TYPE SET	AC Operated Audio Amplifier with Tone Compensated Pre-Amplifier
TUBES (FOURTEEN)	Types, (2) 6SJ7 Pre-Amp., 6SN7GT AF Amp., 7A4 AF Amp., 7A4 Phase Inv., (2) 7A4 AF Amp., 7N7 Bias Control, (2) 7A4 Driver, (2) 2A3 or (2) 6B4G Power Output, 5Y3GT Bias Rect., 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	1.3 Amp. @ 117 Volts AC

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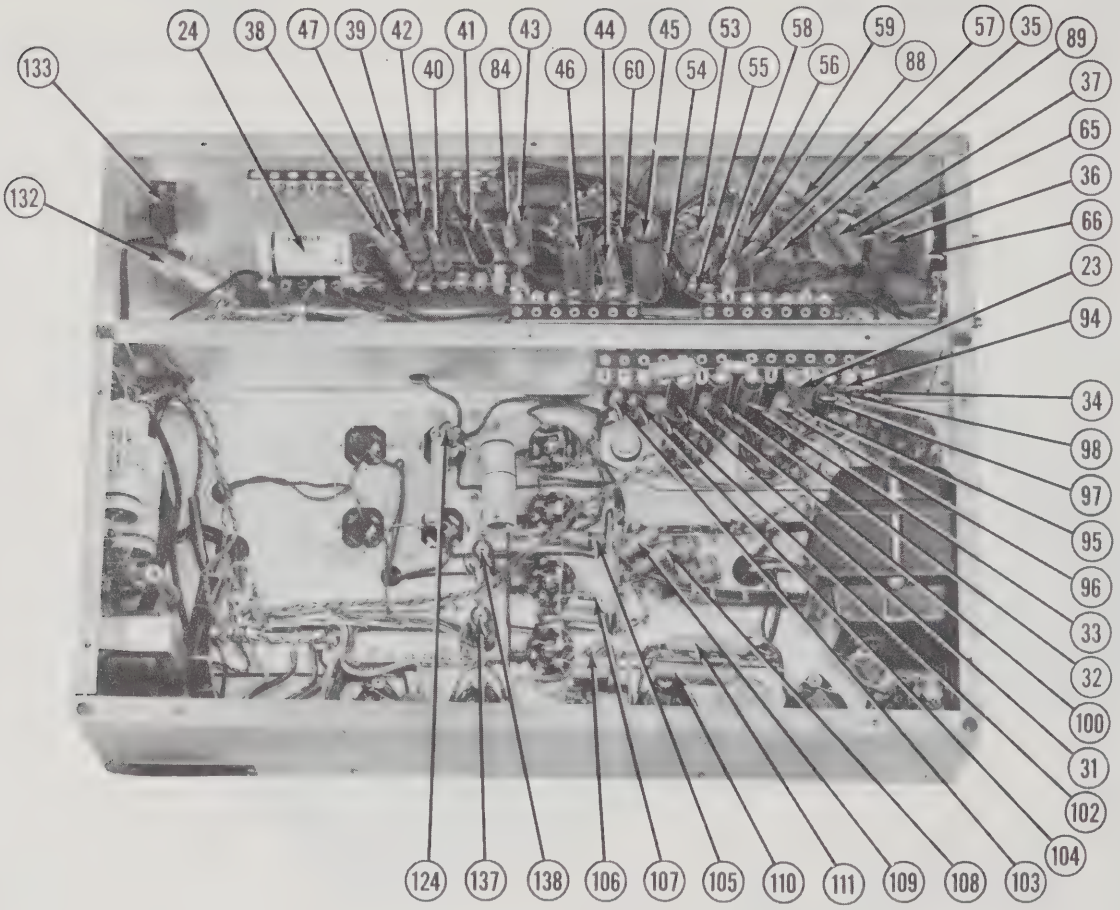
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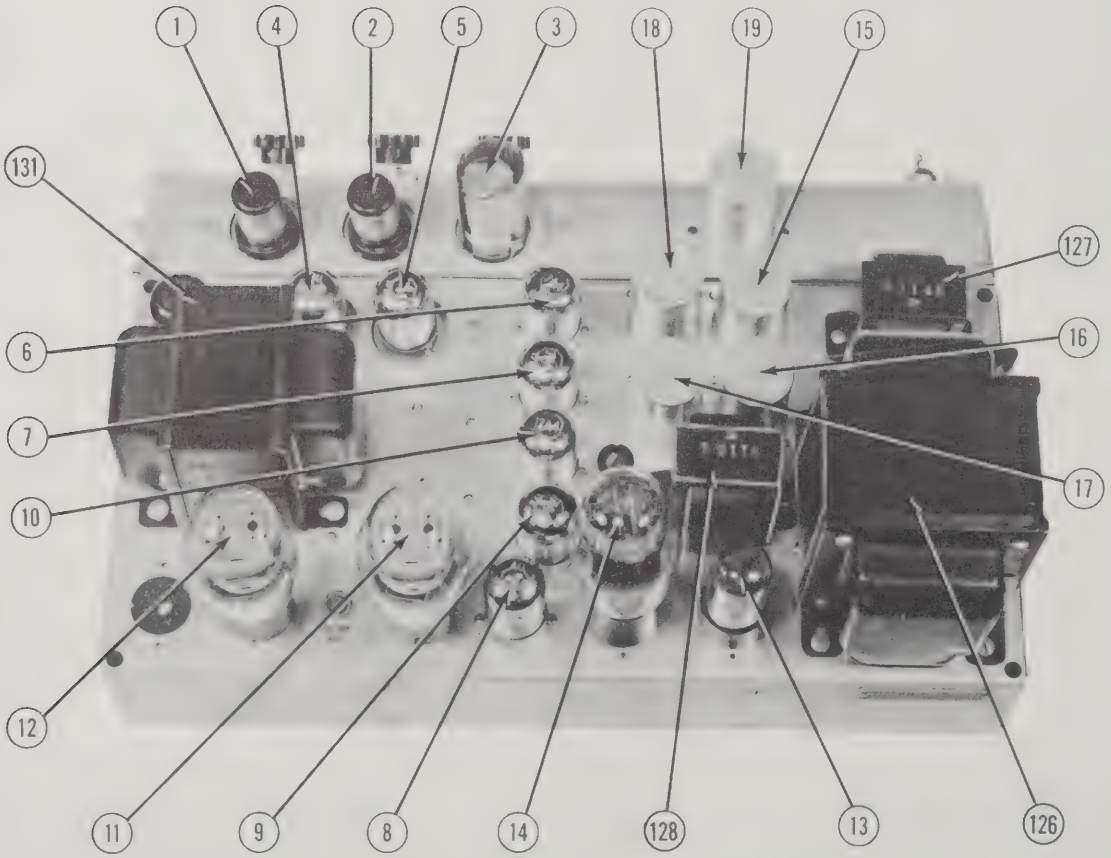
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BROOK MODEL
10C2-A
PAGE 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		BROOK PART No.	STANDARD REPLACEMENT		
1	Pre-Amp.		6SJ7	8N	
2	Pre-Amp.		6SJ7	8N	
3	AF Amp.		6SN7GT	8BD	
4	AF Amp.		7A4	5AC	
5	Phase Inv.		7A4	5AC	
6	AF Amp.		7A4	5AC	
7	AF Amp.		7A4	5AC	
8	Bias Control		7N7	8AC	
9	Driver		7A4	5AC	
10	"		7A4	5AC	
11A	Power Output		2A3	4D	
B	" "		6B4G	5S	
12A	Power Output		2A3	4D	
B	" "		6B4G	5S	
13	Bias Rectifier		5Y3GT	5T	
14	Rectifier		5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	BROOK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
15	30	475			UP3050		EL-3	▲ Filter
16	30	475			UP3050		EL-3	▲ "
17	30	475			UP3050		EL-3	▲ "
18A	20	450		AF88J	UP4245	DY-3x20-450	EL-240	▲ "
B	40	450						■ "
19A	20	450		AF444J	UP2224504	DY-3x20-450	EL-420*	▲ Pre-Amp. Decoupling
B	20	450						▲ " "
C	20	450						■ " "
20	20	450		PRS450-20	BR2045	M-20-450	UT-20	Bias Filter
21	20	450		PRS450-20	BR2045	M-20-450	UT-20	" "
22	40	50		PRS50-50	BR505	M-50-50	TA-550	Cathode Bypass
23	40	50		PRS50-50	BR505	M-50-50	TA-550	" "
24	40	150		PRS150-40	BR4015	M-50-150	UT-401	Fil. Bypass
25	40	50		PRS50-50	BR505	M-50-50	TA-550	Cathode Bypass
26	40	50		PRS50-50	BR505	M-50-50	TA-550	" "
27	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Bias Filter
28	.5	400		484-.5	DT4P5	ST-4-5	TC-5	" "
29	.03	600		684-03	DT6S3	ST-6-03	TC-13	Audio Coupling
30	.03	600		684-03	DT6S3	ST-6-03	TC-13	" "
31	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
32	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
33	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
34	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
35	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
36	.05	600		684-05	DT6S5	ST-6-05	TC-15	Tone Compensation
37	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
38	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
39	.02	600		684-02	DT6S2	ST-6-02	TC-12	" "
40	.02	600		684-02	DT6S2	ST-6-02	TC-12	" "
41	.1	200		484-.1	DT2P1	ST-2-1	TC-1	" "
42	.15	200		484-.15				" "
43	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
44	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
45	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
46	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
47	.15	200		484-.15				" "
48	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
49	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
50	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
51	.01	600		684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
52	.05	600		684-05	DT6S5	ST-6-05	TC-15	Audio Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BROOK PART No.	IRC PART No.	
101	33KΩ	1		BTA-33K	Or.-Or.-Or. Phase Inverter Cathode
102	33KΩ	1		BTA-33K	Or.-Or.-Or. Phase Inverter Plate Load
103	220KΩ	½		BTS-220K	Red-Red-Yl. 1st Driver Grid
104	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd " "
105	1000Ω	1		BTA-1000	Br.-Blk.-Red Driver Cathode
106	4700Ω	½		BTS-4700	Yl.-Vi.-Red Tone Comp.
107	4700Ω	½		BTS-4700	Yl.-Vi.-Red " "
108	22KΩ	1		BTA-22K	Red-Red-Or. 3rd Driver Grid
109	22KΩ	1		BTA-22K	Red-Red-Or. 4th Driver Grid
110	27KΩ	2		BT-2-27K	Red-Vi.-Or. 3rd Driver Cathode
111	27KΩ	2		BT-2-27K	Red-Vi.-Or. 4th Driver Cathode
112	68KΩ	1		BTA-68K	Blue-Gray-Or. Bias Network
113	68KΩ	1		BTA-68K	Blue-Gray-Or. " "
114	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
115	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
116	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
117	150KΩ	½		BTS-150K	Br.-Grn.-Yl. " "
118	150KΩ	½		BTS-150K	Br.-Grn.-Yl. " "
119	330KΩ	½		BTS-330K	Or.-Blue-Yl. " "
120	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
121	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
122	15Ω	5		AB-15	Regulator Cathode
123	1000Ω	10		AB-1000	Filter
124	1000Ω	1		BTA-1000	Br.-Blk.-Red "
125	10KΩ	10		AB-10K	Bleeder

Note 1-Some models use 33KΩ in this application. IRC replacement BTS-33K.
Note 2-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROOKS PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
126	117V AC @ 1.3A	700V CT 1A DC tapped @ 175V Bias .028	5.2V AC @ 3.2A	5.2V AC @ 2.0A	W-113P			
		SEC. 4	SEC. 5	SEC. 6				
		2.5V AC @ 5.0A	6.7V CT @ 2.2A	6.3V AC @ 2.0A				

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 V)	BROOK PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
127	.110A	42Ω	1.7 Henries	W-114K				
128	.037A	280Ω	10 Henries	W-115K		T-20C52†	C-2993	
129	.008A	1200Ω	35 Henries	W-124L	C-1515	T-20C51‡		

†Drill new mounting holes.
‡Drill one new mounting hole.

TRANSFORMER (DRIVER)

TEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO	DC RES.		BROOK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI. to SEC.	PRI.	SEC.					
130	1 to 1	1240Ω	1150Ω	W-116R				
		PRI 2	SEC. 2					
	1 to 1	1240Ω	1150Ω					

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	BROOK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
53	200			1468-0002	5W5T2	MO.5-32	1FM-32	Tone Comp.
54	500			1468-0005	5W5T5	MO.5-35	1FM-35	" "
55	1000			1467-001	1W5D1	MW.5-21	1FM-21	" "
56	1000			1467-001	1W5D1	MW.5-21	1FM-21	" "
57	500			1468-0005	5W5T5	MO.5-35	1FM-35	" "
58	1000			1467-001	1W5D1	MW.5-21	1FM-21	" "
59	1500			1467-0015	1W5D15	MW.5-215	1FM-215	" "
60	5000			1467-005	1D5D5	MW.5-25	1FM-25	" "
61	50			1468-00005	5W5Q5	MO.5-45	1FM-45	Output Plate Bypass
62	50			1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
63	1000			1467-001	1W5D1	MW.5-21	1FM-21	Tone Comp.
64	1000			1467-001	1W5D1	MW.5-21	1FM-21	" "

*Omit one section.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BROOK PART No.	IRC PART No.	CLAROSTAT PART No.	
65A	450KΩ	½		D18-133XX		Volume Control tapped @ 100KΩ & 200KΩ
B	Shaft			A		Attach to 65A per instructions
66A	450KΩ	½		D11-133	M-58-S	Volume Level Control
B	Shaft			A	Not Req.	Attach to 66A per instructions
67	40Ω	1		W-40	43-4	Hum Bal. Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BROOK PART No.	IRC PART No.	
68	22KΩ	1		BTA-22K	Red-Red-Or. 1st AF Grid
69	2200Ω	1		BTA-2200	Red-Red-Red 1st AF Cathode
70	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Tone Compensation
71	100KΩ	1		BTA-100K	Br.-Blk.-Yl. 1st AF Plate Load
72	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
73	2200Ω	1		BTA-2200	Red-Red-Red 2nd AF Cathode
74	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 2nd AF Plate Load
75	22KΩ	1		BTA-22K	Red-Red-Or. 1st AF Decoupling
76	22KΩ	1		BTA-22K	Red-Red-Or. 2nd AF Decoupling
77	2200Ω	1		BTA-2200	Red-Red-Red 3rd AF Cathode
78	68KΩ	1		BTA-68K	Blue-Gray-Or. Tone Comp.
79	100KΩ	1		BTA-100K	Br.-Blk.-Yl. 3rd AF Plate Load
80	22KΩ	1		BTA-22K	Red-Red-Or. Decoupling
81	33KΩ	1		BTA-33K	Or.-Or.-Or. 4th AF Plate Load
82	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 4th AF Grid
83	4700Ω	1		BTA-4700	Yl.-Vi.-Red 4th AF Cathode
84	2.2 Meg	½		BTS-2.2Meg	Red-Red-Grn. Tone Compensation
85	47KΩ	½		BTS-47K	Yl.-Vi.-Or. " "
86	47KΩ	½		BTS-47K	Yl.-Vi.-Or. " "
87	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
88	22KΩ	½		BTS-22K	Red-Red-Or. " "
89	22KΩ	½		BTS-22K	Red-Red-Or. " "
90	220KΩ	½		BTS-220K	Red-Red-Yl. Bleeder
91	47KΩ	½		BTS-47K	Yl.-Vi.-Or. " -See Note 1
92	50Ω				Series Filament-See Note 2
93	50Ω				" " " " "
94	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 5th AF Grid
95	4700Ω	½		BTS-4700	Yl.-Vi.-Red 5th AF Cathode
96	33KΩ	1		BTA-33K	Or.-Or.-Or. 5th AF Plate Load
97	1000Ω	½		BTS-1000	Br.-Blk.-Red Feedback
98	82Ω	½		BW-½-82	Gray-Red-Blk. "
99	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phase Inverter Grid
100	4700Ω	½		BTS-4700	Yl.-Vi.-Red Phase Inverter Cathode

DATE 8/48-#4313-7 SET #45-FOLDER #7

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BROOK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
131	4300Ω CT	1.5-3Ω 3-6Ω 6-11Ω 11-16Ω 16-30Ω 500Ω	230Ω CT	.2Ω .3Ω .7Ω 1.1Ω 1.5Ω 40Ω	W-126K				

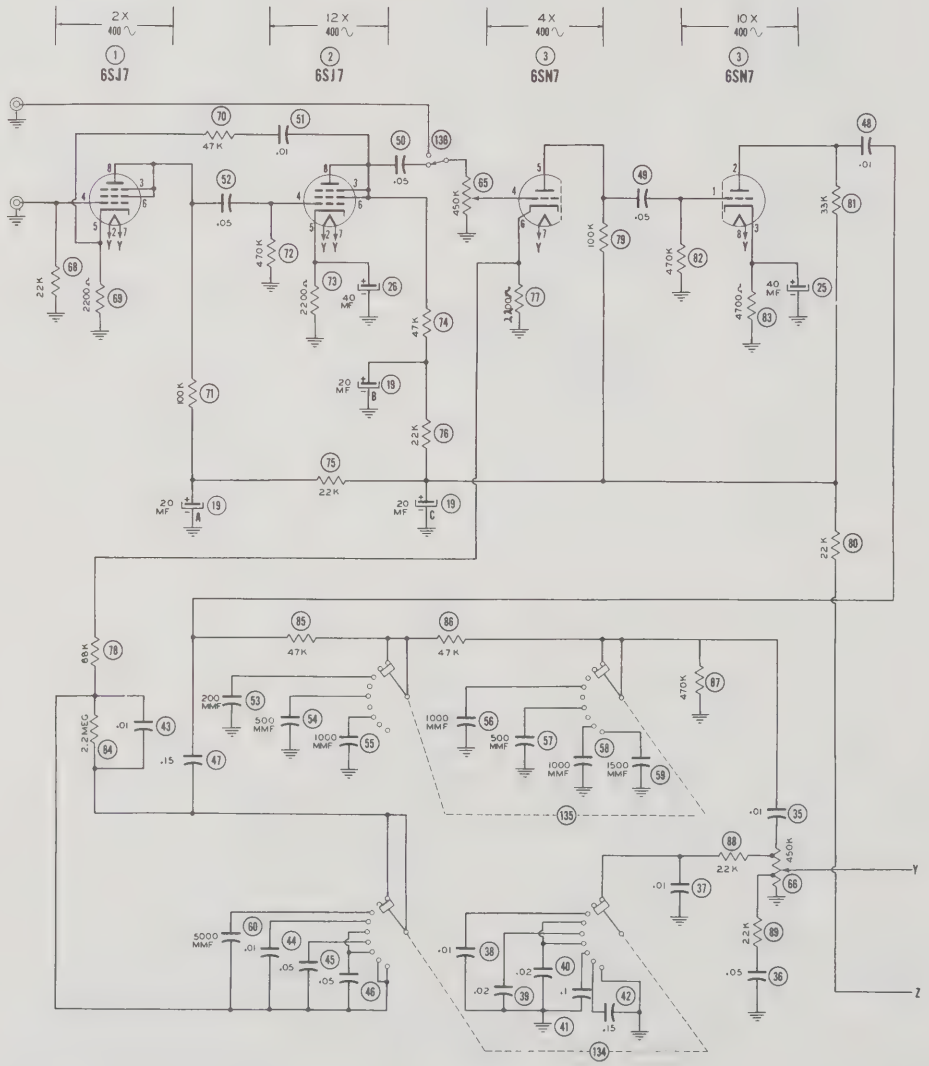
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					BROOK PART No.		
132	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	BROOK PART No.	NOTES
133	Switch		Power
134	"		Bass
135	"		Treble
136	"		Pre-Amp.
137	Fuse		3 Amp.
138	"		.5 Amp.

BROOK MODEL 10C2-A PAGE 5



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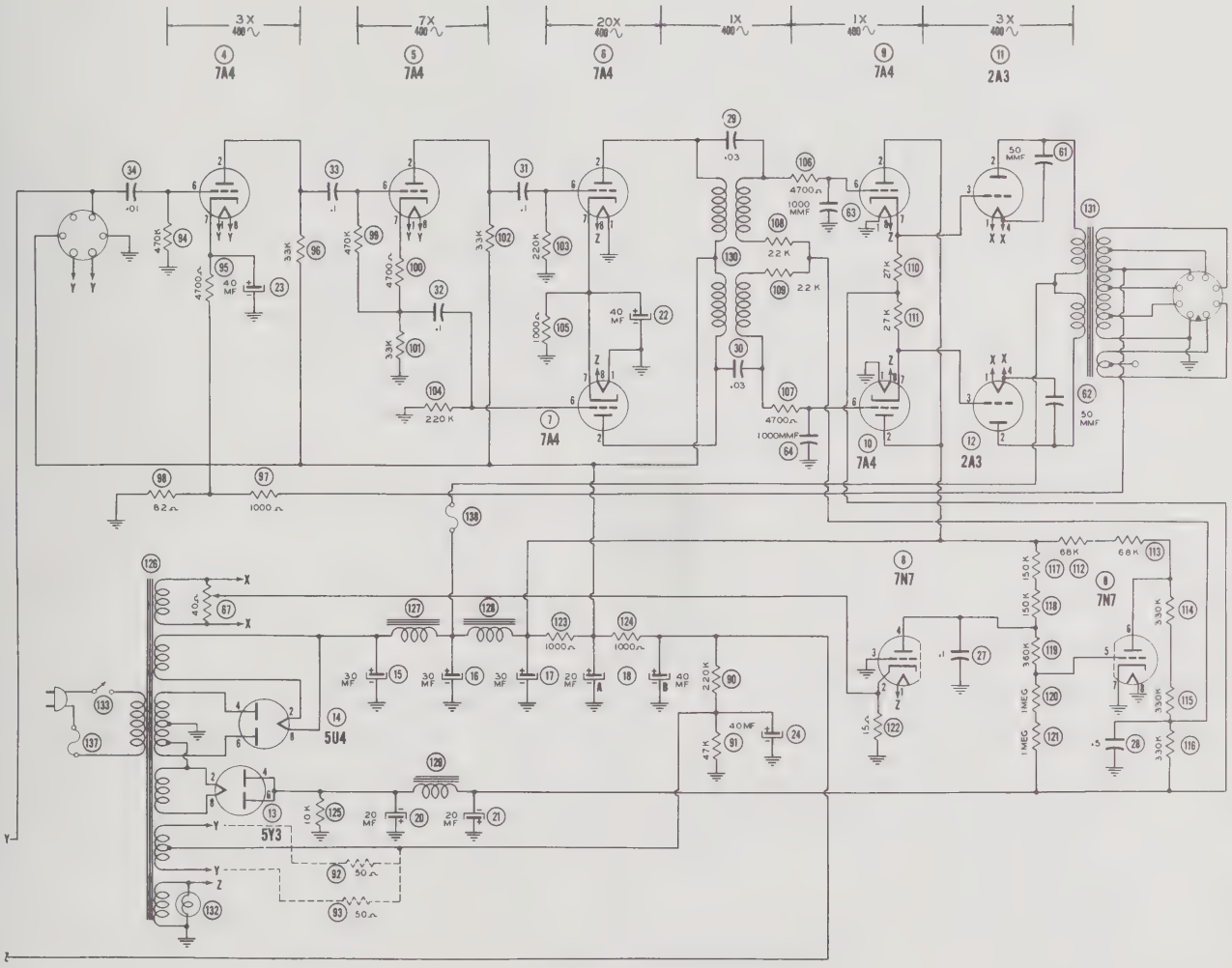

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VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	55VDC**	65VDC	0V.	2.7VDC	65VDC	55VDC**	65VDC
2	6SJ7	0V.	55VDC**	92VDC	0V.	4VDC	92VDC	55VDC**	92VDC
3	6SN7	0V.	170VDC	7.1VDC	0V.	75VDC	2.5VDC	55VDC**	55VDC**
4	7A4	55VDC**	290VDC	0V.	0V.	0V.	0V.	12VDC	55VDC**
5	7A4	55VDC**	300VDC	0V.	0V.	0V.	22VDC	75VDC	55VDC**
6	7A4	0V.	360VDC	0V.	0V.	0V.	0V.	23VDC	6.3VAC
7	7A4	0V.	360VDC	0V.	0V.	0V.	0V.	23VDC	6.3VAC
8	7N7	0V.	1VDC	33VDC	0V.	-1VDC	50VDC	0V.	6.3VAC
9	7A4	0V.	400VDC	0V.	0V.	0V.	-107VDC	-85VDC	6.3VAC
10	7A4	0V.	400VDC	0V.	0V.	0V.	-107VDC	-85VDC	6.3VDC
11	2A3	1.6VDC*‡	400VDC	-85VDC	1.6VDC*‡	-	-	-	-
12	2A3	1.6VDC*‡	400VDC	-85VDC	1.6VDC*‡	-	-	-	-
13	5Y3GT	0V.	175VAC	0V.	-200VDC	0V.	-200VDC	0V.	175VAC
14	5U4G	0V.	410VDC	350VAC	350VAC	0V.	350VAC	0V.	410VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	30KΩ**	180KΩ	22KΩ	2.2KΩ	180KΩ	30KΩ**	180KΩ
2	6SJ7	0Ω	30KΩ**	130KΩ	470KΩ	2.2KΩ	130KΩ	30KΩ**	130KΩ
3	6SN7	470KΩ	100KΩ	4.7KΩ	0Ω	160KΩ	2.2KΩ	30KΩ**	30KΩ**
4	7A4	30KΩ**	74KΩ	INF.	INF.	INF.	470KΩ	4.7KΩ	30KΩ**
5	7A4	30KΩ**	74KΩ	INF.	INF.	INF.	470KΩ	37KΩ	30KΩ**
6	7A4	0Ω	41KΩ	INF.	INF.	INF.	220KΩ	1KΩ	.1Ω
7	7A4	0Ω	41KΩ	INF.	INF.	INF.	220KΩ	1KΩ	.1Ω
8	7N7	0Ω	14Ω	340KΩ	0Ω	500KΩ	170KΩ	0Ω	.1Ω
9	7A4	0Ω	40KΩ	INF.	INF.	INF.	260KΩ	37KΩ	.1Ω
10	7A4	0Ω	40KΩ	INF.	INF.	INF.	260KΩ	37KΩ	.1Ω
11	2A3GT	23Ω*‡	40KΩ	37KΩ	23Ω*‡	-	-	-	-
12	2A3GT	23Ω*‡	40KΩ	37KΩ	23Ω*‡	-	-	-	-
13	5Y3GT	INF.	17Ω	INF.	10KΩ	INF.	10KΩ	INF.	17Ω
14	5U4G	INF.	40KΩ	35Ω	35Ω	INF.	34Ω	INF.	40KΩ

**MEASURE 6.6VAC BETWEEN PINS.
*‡MEASURE 2.5VAC BETWEEN PINS.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected for measurements.

TRADE NAME	Crosley, Models 88TA, 88TC Revised
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6SH7 Mixer, 7F8 Converter, 6SG7 IF Amp., 6SH7 FM Limiter-AM Det., 6H6 FM Det., 6SJ7 AF Amp., 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC — RATING .38 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — FREQ. MOD. 88-108MC

Crosley, Models 88TA, 88TC Revised are same as 88TA, 88TC Set #38 - Folder #3 with the exceptions listed below and shown on the schematic diagram on the reverse side. Note that changes center around addition of local-distance switch.

CROSLEY MODELS
88TA, 88TC (Revised)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
29	.01	400	39001-13	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
85	.01	400	39001-13	484-01	DT4S1	ST-4-01	TC-11	Local-Distance Switch Isolation

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
57	Not Used				
86	10KΩ	½	39373-54	BTS-10K	Br.-Blk.-Yl. Series Vol. Control
87	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Volume Control Shunt
88	22KΩ	½		BTS-22K	Red-Red-Or. Bleeder
89	1000Ω	½	39373-3	BTS-1000	Br.-Blk.-Red Voltage Dropping

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
90	Switch	W-144317	Local-Distance

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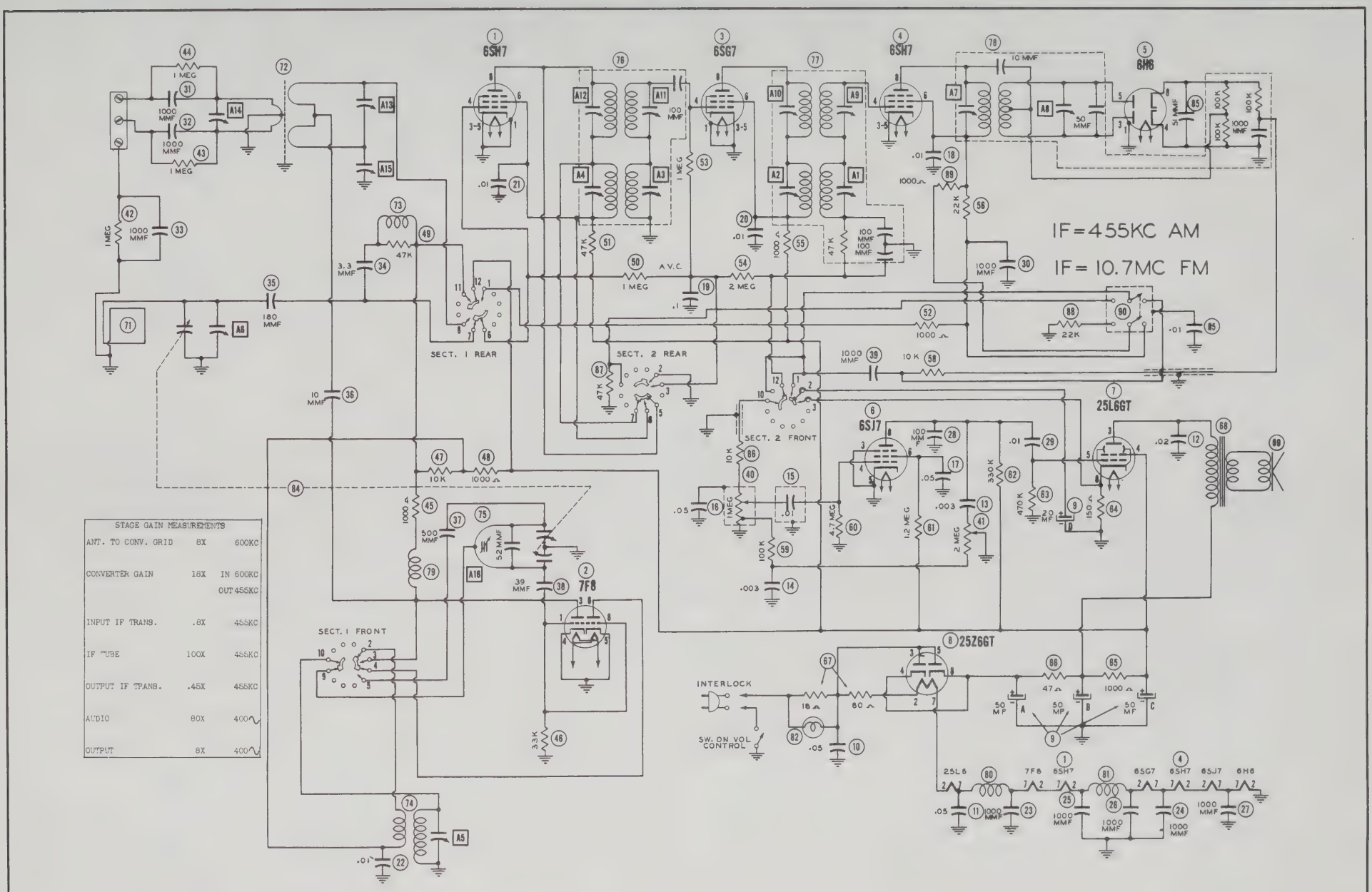

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DeWALD MODEL B-504
BATTERY-LINE OPERATED

DeWALD MODEL B-504
BATTERY-LINE OPERATED

DEWALD MODEL B-504

TRADE NAME	DeWald, Model B-504
MANUFACTURER	DeWald Radio Mfg. Corp., 35-28 49th St., Long Island City, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output
POWER SUPPLY RATING	110-120 Volts AC-DC or 4.5 Volt "A" Supply and 67.5 Volt "B" Supply .15 Amp. @ 117 Volts AC or 108MA @ 4.5 Volts DC and 12MA @ 67.5 Volts
TUNING RANGE—BROADCAST	540-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for max. output.
2		"	1700KC	"	"	A5	Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

DEWALD MODEL B-504

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		DeWald PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DeWALD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	50	150	2020B	PRS-A5C3010	CDL5315	DSB-5C30-150	TA-530	Filter-Yl.
B	30	150						" -Red
C	150	15			BRH151	M-100-15	UHC-115	Filament Bypass-Blue
6	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.1	200		484-.1	DT3P1	ST-2-1	TC-1	Filament Bypass
8	.001	600		684-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
9	.01	200		484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
10	.01	200		484-01	DT2S1	ST-4-01	TC-11	AF Screen Bypass
11	.001	600		684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
12	.02	200		484-02	DT2S2	ST-4-02	TC-12	Screen Bypass
13	.05	400		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
14	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
15	220	300		1468-0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter-Cer.
16	47	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	DeWALD PART No.	IRC PART No.	CLAROSTAT PART No.	
17	1 Meg.	½	3012		15/16-63-2 DPST Sw.#	Volume Control & Sw.

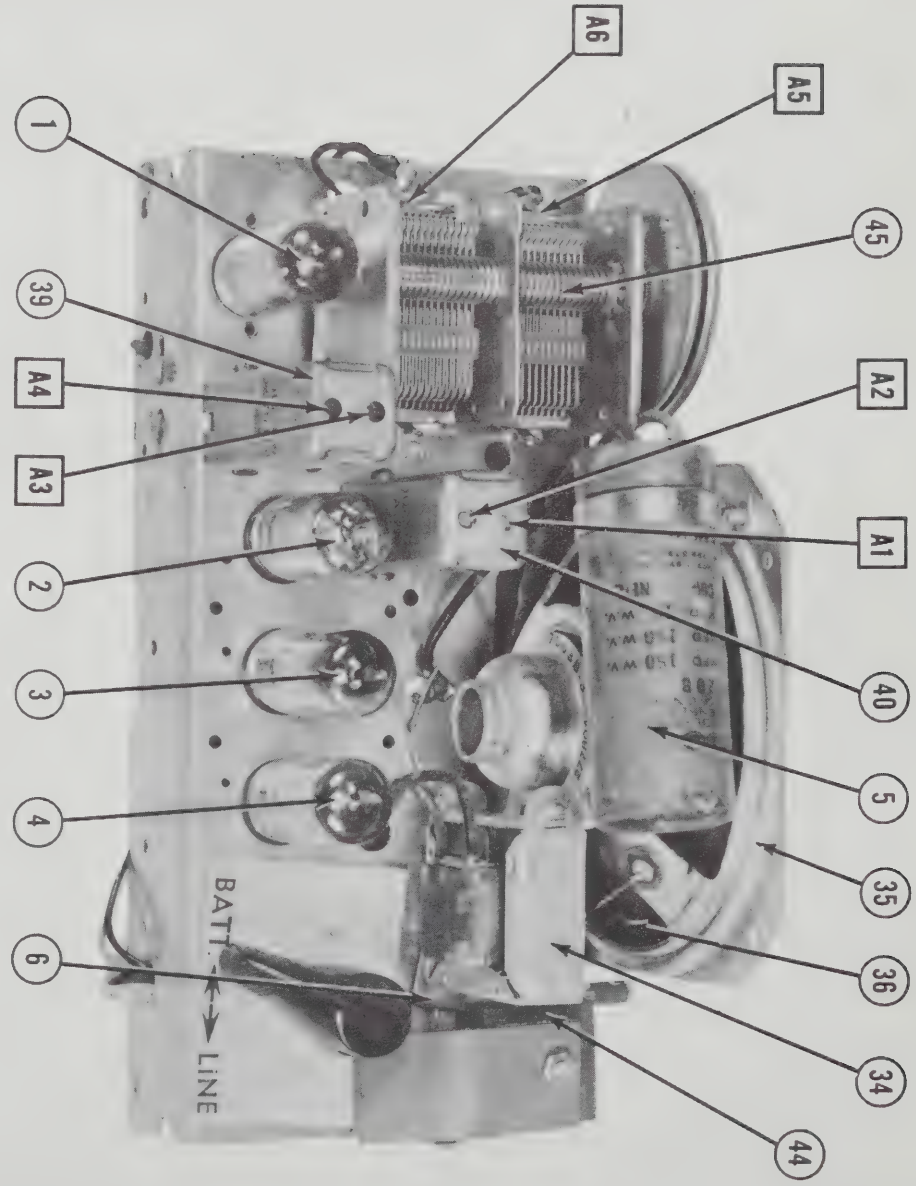
#Attached at factory.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DeWALD PART No.	IRC PART No.	
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Osc. Grid
19	10KΩ	½		BTS-10K	Br.-Blk.-Or. Screen Dropping
20	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
22	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
23	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
24	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
25	1200Ω	½		BTS-1200	Br.-Red-Red Filament String
26	270Ω	½		BW-½-270	Red-Vi.-Br. " "
27	150Ω	½		BW-½-150	Br.-Grn.-Br. " "
28	150Ω	½		BW-½-150	Br.-Grn.-Br. " "
29	27Ω	3		AB-25	Red-Vi.-Blk. Filament Dropping
30A	2100Ω	5		ABA-2250	" " -See Note 1
B	75Ω	5		AB-75	Surge Limiter
31	1800Ω	½		BTS-1800	Br.-Gray-Red Bleeder-See Note 2
32	2700Ω	½		BTS-2700	Red-Vi.-Red Filter
33	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. Bias

Note 1-On IRC replacement set slider 150Ω from end.
Note 2-Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DeWALD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
34	8500Ω	3.5Ω	650Ω	.5Ω	Part of 7003B3	A-3848*	T22S47*	A-2900*	*Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DeWald PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113		
35	PM	3.5Ω	7003B3	Mod. P4-X	4A07	
	VC DIA.	VC DIA.				
36	4"	1/2"				

R F COILS

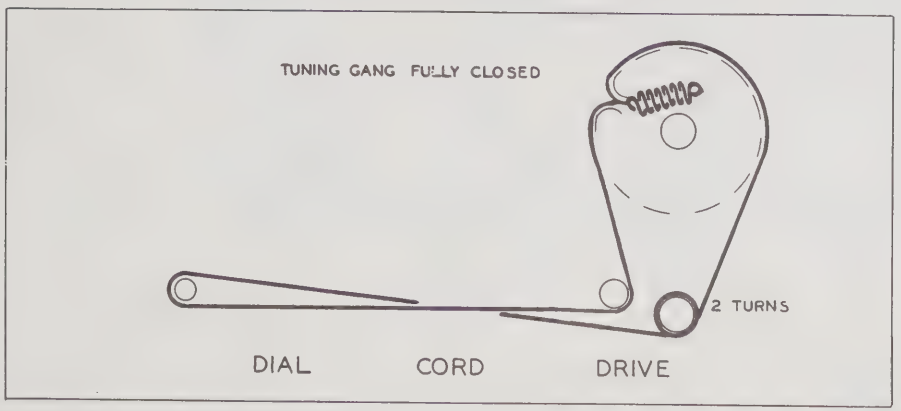
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DeWald PART No.	MEISSNER PART No.	
37	Loop Ant.		3.2Ω	1037		
38	Osc. Coil	1.3Ω	6.2Ω	1034	14-1060	
39	Input IF	24.2Ω	24.2Ω	1027C-4	16-6668	
40	Output IF	37Ω	36Ω	1027-1	16-666[illegible]	

BATTERIES

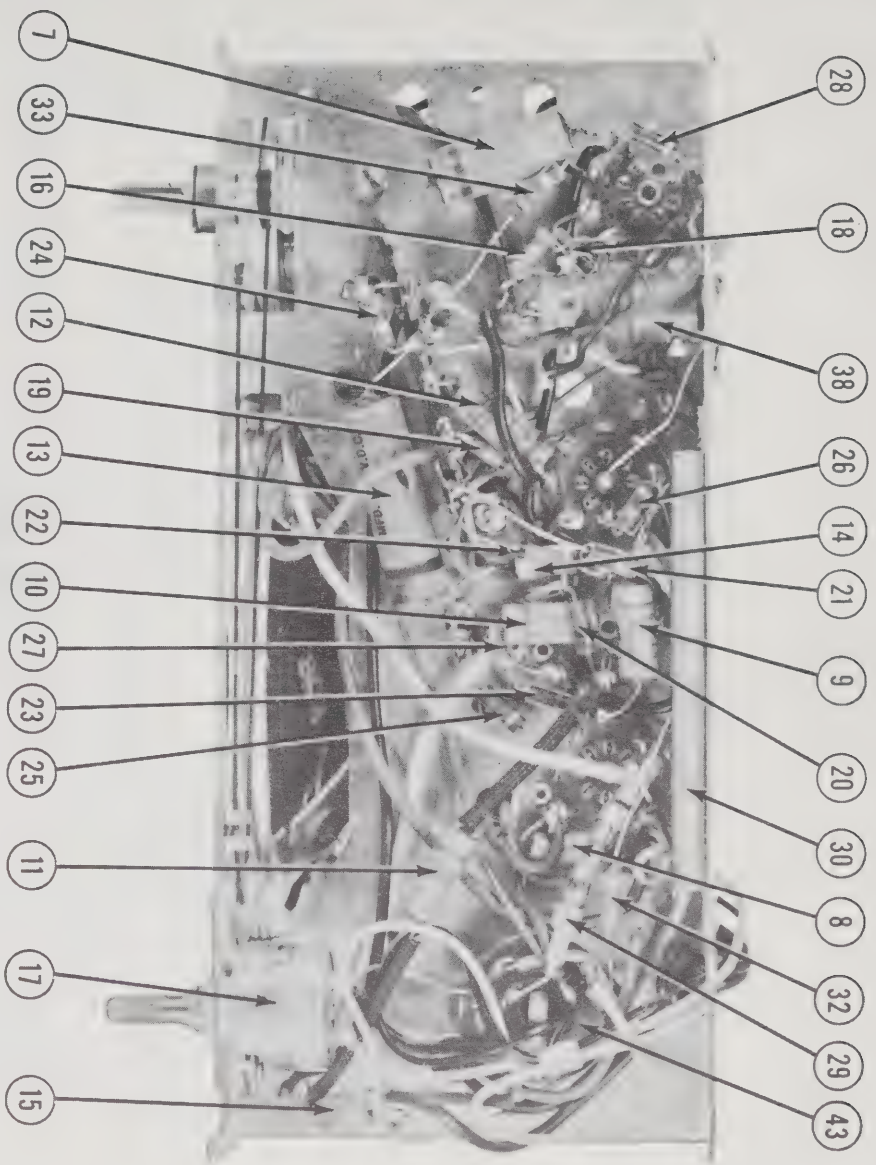
ITEM No.	VOLTAGE	DeWald PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
41	1.5V "A"		#746			G3			
42	67.5V"B"			#467			XX45		

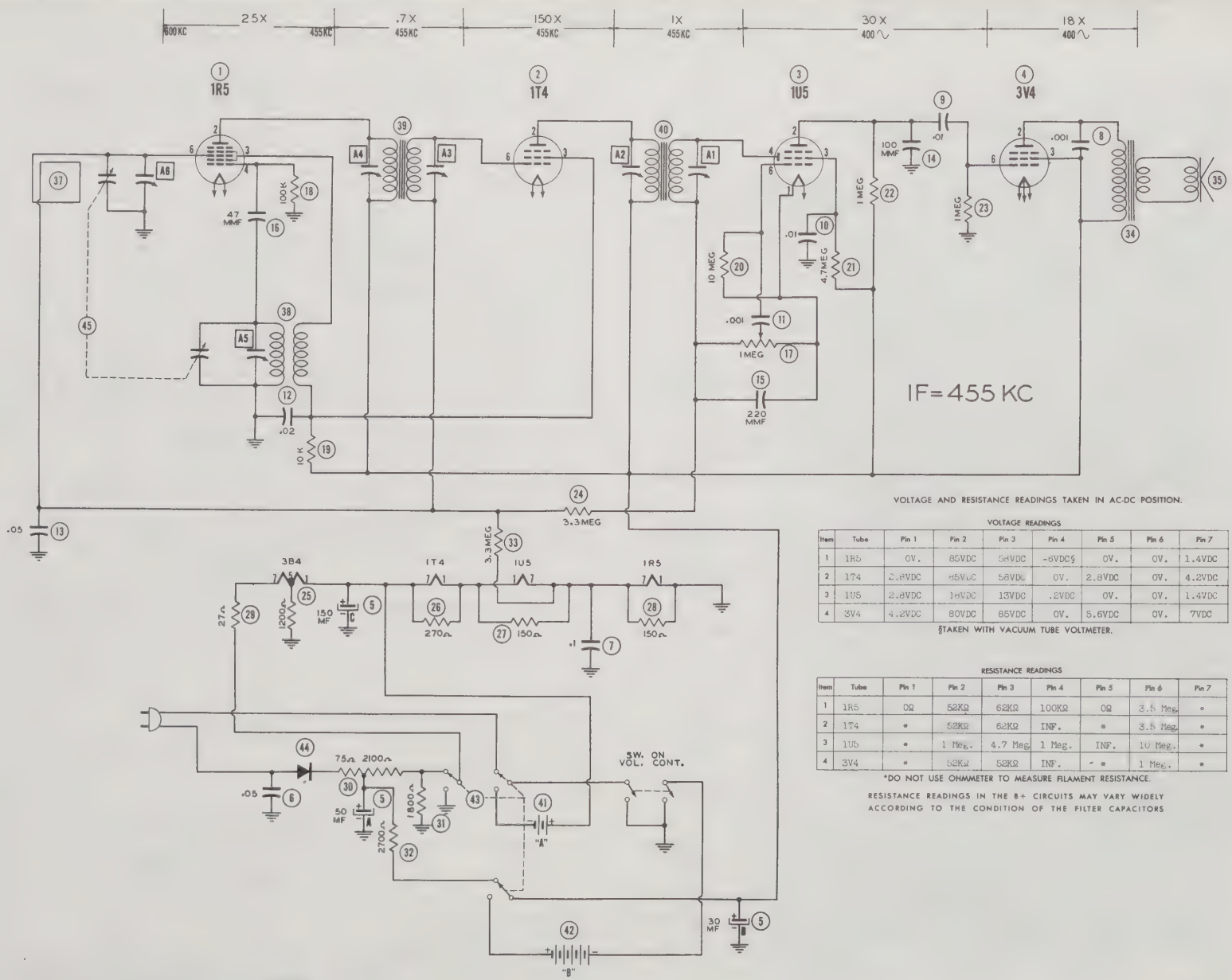
MISCELLANEOUS

ITEM No.	PART NAME	DEWALD PART No.	NOTES
43	Switch		AC/DC-Batt.
44	Rectifier	8018A	Selenium
45	2 Gang Var.Cap.	2017B	(25-465MMF, 25-1[illegible]MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	85VDC	58VDC	-6VDC§	0V.	0V.	1.4VDC
2	1T4	2.8VDC	85VDC	58VDC	0V.	2.8VDC	0V.	4.2VDC
3	1U5	2.8VDC	18VDC	13VDC	.2VDC	0V.	0V.	1.4VDC
4	3V4	4.2VDC	80VDC	85VDC	0V.	5.6VDC	0V.	7VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	52KΩ	62KΩ	100KΩ	0Ω	3.5 Meg.	*
2	1T4	*	52KΩ	62KΩ	INF.	*	3.5 Meg.	*
3	1U5	*	1 Meg.	4.7 Meg.	1 Meg.	INF.	10 Meg.	*
4	3V4	*	52KΩ	52KΩ	INF.	*	1 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4813-9

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin #1 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

EMERSON MODEL 557B

TRADE NAME	Emerson, Model 557B (Ch. 120048B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th Ave., New York, N.Y.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SB7Y Converter, 6SG7 1st IF Amp., 6SG7 FM 2nd IF Amp., 6SH7 FM Limiter, 6S8GT Disc.-Det.-AVC-AF, 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
RATING	.43 Amp. @ 117 Volts AC
TUNING RANGE-	BROADCAST 540-1620KC FREQ. MOD. 88-108MC

EMERSON MODEL
557B (Ch. 120048B)

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The dial backplate bears reference marks for alignment frequencies, the top row for AM and the bottom row for FM. These marks are: for AM, end limit, 600KC and 1500KC; for FM, 90MC, 99MC, 106MC and 108MC. To set pointer turn tuning cap. fully closed and set pointer to end limit mark.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	455KC	BC (fully counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1500KC	"	1500KC reference mark on dial back-plate.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3	.1 MFD.	"	"	"	Tune for maximum output.	"	A6	Adjust for maximum output

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.01 MFD.	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (3). Low side to chassis.	10.7MC (Unmodulated)	FM (fully clock-wise)	Tuning cap. fully open.	DC probe to Point A. Common to chassis	A7,A8	Adjust for maximum deflection.
5	.01 MFD.	High side to Pin 4 (grid) of 6SG7 1st IF Tube (2). Low side to chassis.	"	"	"	"	A9,A10	"
6	.01 MFD.	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	"	"	"	"	A11,A12	"
7	.01 MFD.	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (3). Low side to chassis.	"	"	"	DC probe to Point B. Common to chassis	A13	"
8	.01 MFD.	"	"	"	"	DC probe to Point C. Common to chassis	A14	Adjust for zero deflection. Continue with FM-RF Alignment in Step 9.

FOR ALTERNATE FM IF AND FM RF ALIGNMENT SEE PAGE FOUR.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SB7Y	6SB7Y	8R	
2	1st IF Amp.	6SG7	6SG7	8BK	
3	FM-2nd IF Amp.	6SG7	6SG7	8BK	
4	FM Limiter	6SH7	6SH7	8BK	
5	Disc. Det.-AVC-AF	6S8GT	6S8GT	8CB	
6	Power Output	25L6GT	25L6GT	7AC	
7	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

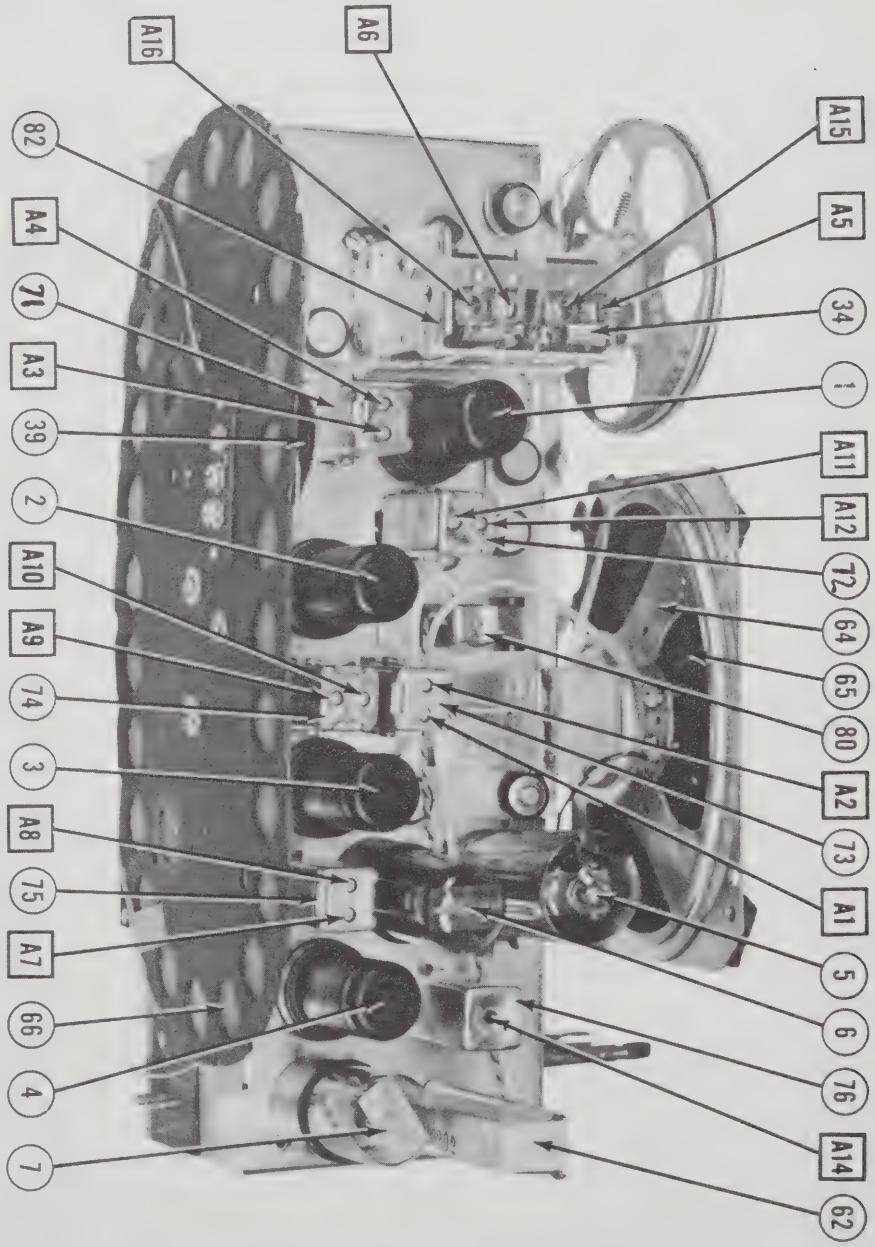
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	50	150	925064	PRSA150/50-50	EZ5515	DSB-2x50-150	TA-505	Filter-Grn.
B	50	150						" -Red
9A	50	150	925064	PRSA150/50-50	EZ5515	DSB-2x50-150	TA-505	" -Grn.
B	50	150						" -Red
10	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	Line Filter
11	.005	400	920180	484-005	DT6D5	ST-6-005	TC-25	Rectifier Bypass
12	.02	400	920020	484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
13	.002	600	920515	684-002	DT6D2	ST-6-002	TC-22	Tone Compensation
14	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
15	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	" "
16	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	" "
17	.001	600	920514	684-001	DT6D1	ST-6-001	TC-21	De-emphasis
18	.01	200	920092	484-01	DT2S1	ST-4-01	TC-11	Lim. Plate Decoup.
19	.01	200	920092	484-01	DT2S1	ST-4-01	TC-11	Lim. Screen Bypass
20	.01	200	920092	484-01	DT2S1	ST-4-01	TC-11	2nd IF Decoupling
21	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	2nd IF Grid Filter
22	.01	200	920092	484-01	DT2S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
23	.05	200	920060	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
24	.01	200	920092	484-01	DT2S1	ST-4-01	TC-11	RF Bypass Power Supply
25	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	Filament Bypass
26	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	" "
27	.01	400	920090	484-01	DT4S1	ST-4-01	TC-11	" "
28	500	300	910014	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass-Cer.
29	470	500	910014	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass Pwr. Supply
30	110	300	910010	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
31	50	300	928102	1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Grid Filter-Cer.
33	5000	500	928109	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Screen Bypass-Cer.
33	75	300	928015	1468-000075	5W5Q7	MOS.5-47	1FM-475	Osc. Grid Cap.-Cer.
34	5	300	928017	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer-Cer.
35	2.2	500	915005					Feedback-Cer.
36	50	300	928014	1468-00005	5W5Q5	MO.5-45	1FM-45	Filament Bypass-Cer.
37	15	500	928016				MS-415	RF Bypass
38	1000	300	928003	1468-001	1W5D1	MO.3-21	1FM-21	FM Ant. Coupling-Cer.
39	2.2	500	915005					AM " " "
40	1000	300	928003	1468-001	1W5D1	MO.3-21	1FM-21	Ext. Ant. Isolation-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
41A	500KΩ	½	390027	D11-133	AM-58-S	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 41A per instructions
C	Switch		" "	41	SW-A	" " " " "
42A	500KΩ	½	390028	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 42A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	
43	2.2KΩ	½	340910	BTS-2.2K	Red-Red-Or. Osc. Grid
44	18KΩ	½	340890		Br.-Grn.-Br. Parasitic Suppressor
45	2.2 Meg.	½	351290	BTS-2.2 Meg.	Red-Red-Grn. 2nd IF Grid
46	680Ω	½	350450	BTS-680	Blue-Gray-Br. 2nd IF Decoupling
47	47KΩ	½	340890	BTS-47K	Yl.-Vl.-Or. Limiter Grid
48	680Ω	½	340690	BTS-6800	Blue-Gray-Red Bleeder
49	22KΩ	½	340810	BTS-22K	Red-Red-Or. Limiter Screen Dropping
50	47KΩ	½	340890	BTS-47K	Yl.-Vl.-Or. Limiter Plate Decoupling
51	100KΩ	½	340970	BTS-100K	Br.-Blk.-Yl. Disc. Diode Load
52	100KΩ	½	340970	BTS-100K	Br.-Blk.-Yl. " " "
53	68KΩ	½	350930	BTS-68K	Blue-Gray-Or. De-emphasis
54	3.3 Meg.	½	351330	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
55	15 Meg.	½	397000	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
56	470KΩ	½	351130	BTS-470K	Yl.-Vl.-Yl. AF Plate Load
57	150Ω	½	380250	Bw-½-150	Br.-Grn.-Br. Output Cathode
58	1000Ω	½	340490	BTS-1000	Br.-Blk.-Red Filter
59	680Ω	½	340450	BTS-680	Blue-Gray-Br. "
60	680Ω	1	370450	BTA-680	Blue-Gray-Br. "
61	15Ω	1	380050	BW-1-15	Br.-Grn.-Blk. Surge Limiter
62A	91Ω	10W	340120		Line Dropping
B	17Ω				Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		EMERSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
63	2250Ω	3.6Ω	168Ω tapped @ 8Ω	.7Ω	734015	A-3330		A-2928*	*Add extra filter to reduce hum level.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
64	PM	3.6Ω	180031		46A15*	*Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
65	4"x6"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.	
66	Loop Ant.	.2Ω	1.5Ω	700011		700021 Alternate
67	Ant. Coil FM		0Ω	713008		
68	Osc. " AM	.4Ω	7.5Ω	716015	14-1060	
69	" " FM		0Ω	716013		
70	Conv. Cath. Choke	.2Ω		705002		
71	1st IF AM	14Ω	11Ω	720031		
72	" " FM	1.5Ω	1.5Ω	720024		
73	2nd IF AM	11Ω		720032		
74	" " FM	1.5Ω	1.5Ω	720025		
75	3rd IF FM	1.5Ω	1.5Ω	720026		
76	Disc. Trans.	.8Ω	1Ω	708005		
77	RF Choke		0Ω			
78	" "		1Ω	705011		
79	" "		1Ω	705011		

DATE 7/48-4-4813-10 SET #43-FOLDER #10

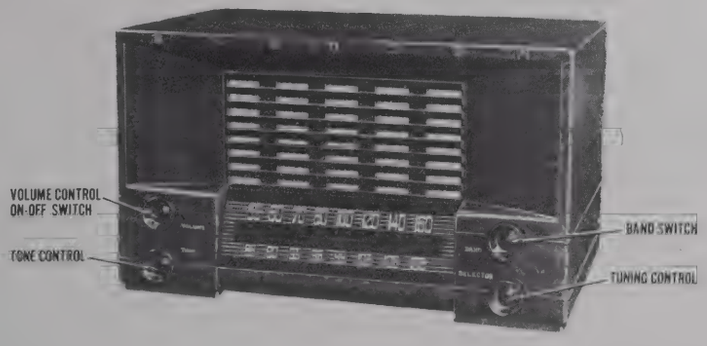
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					EMERSON PART No.		
80	Bayonet	6-8	0.15	Brown	807000		Type 47

MISCELLANEOUS

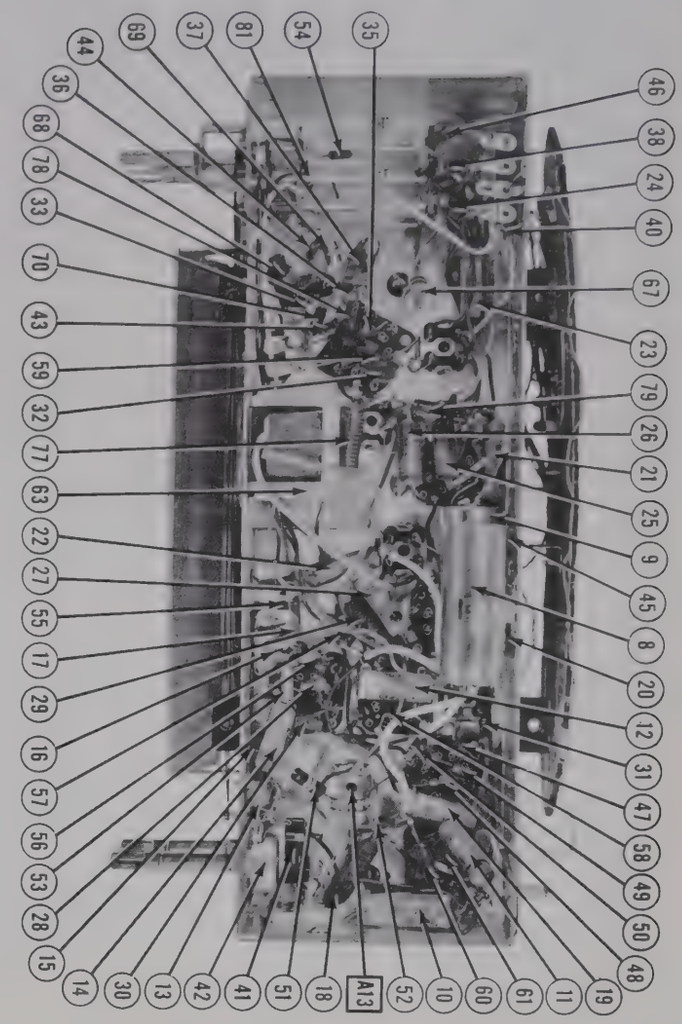
ITEM No.	PART NAME	EMERSON PART No.	NOTES
81	Switch	510009	Band
82	Tuning Gang	900400	AM (31-530MTF, 25-200MTF)
	Dial Crystal	520046	
	Dial Pointer	525017	
	Knob	486470	
	Cabinet	140113	



DATE 8/48-4-4813-10 SET #43-FOLDER #10

FOR AM AND ALTERNATE FM IF ALIGNMENT SEE FRONT PAGE.

CHASSIS—BOTTOM VIEW



FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450∿ sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4	.01 MFD.	High side to Pin 4 (grid) of 6SG7 1st IF Tube (2) Low side to chassis.	10.7MC (Freq. Modulated)	FM	Tuning cap. fully open.	Vertical input to Point A. Ground to chassis.	A7,A8, A9,A10	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
5	.01 MFD.	Disconnect FM Ant. Coil (67) from Pin 8 (grid) of 6SB7Y. Shunt 100KΩ from Pin 8 to chassis. High side to Pin 8. Low side to chassis.	"	"	"	"	A11, A12	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Remove 100KΩ resistor and reconnect FM Ant. Coil (67) to Pin 8 of 6SB7Y.
6	.01 MFD.	High side to Pin 4 (grid) of 6SG7 1st IF Tube (2) Low side to chassis.	"	"	"	Vertical input to Point A. Ground to chassis.	A13, A14	Alternately adjust A13 for maximum amplitude and A14 for maximum straightness of crossover lines with crossover occuring at center of pattern per Fig. 2. Continue with FM-RF Alignment Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	300Ω carbon res.	High side to FM Ant. terminal "A". Low side to chassis.	108MC (unmodulated)	FM	108MC reference mark on dial backplate.	DC probe to Point A. Common to chassis.	A15	Adjust for maximum deflection.
10	"	"	108MC	"	Tune for maximum deflection	"	A16	"

FIG. 1

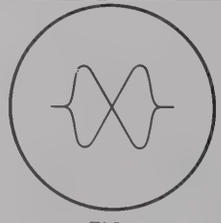
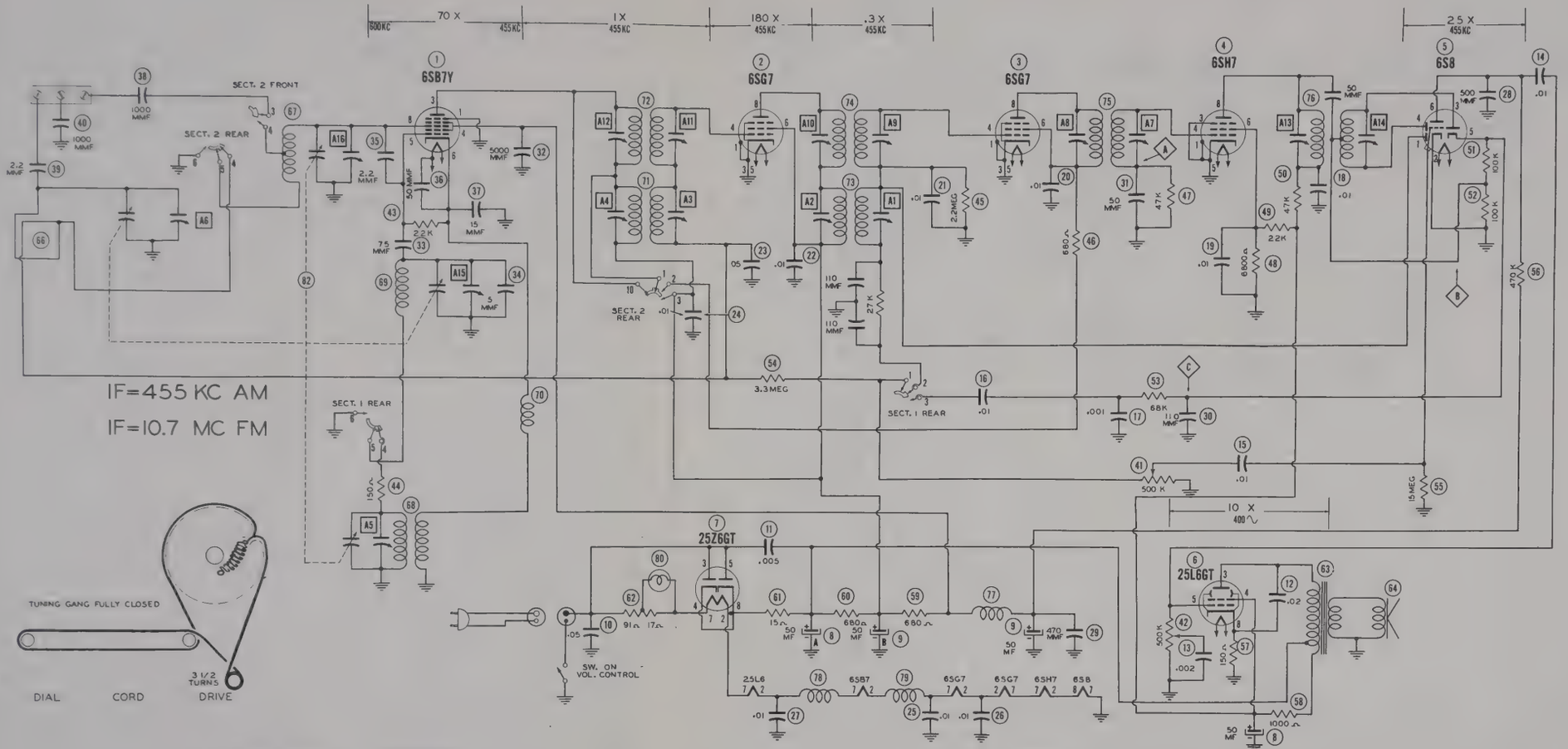


FIG. 2



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6SB7Y	V.	V.	112VDC	105VDC	-7.1VDC§	0V.	33VAC	-.7VDC	-
2	6SG7	V.	V.	0V.	-.7VDC	0V.	112VDC	25VAC	112VDC	-
‡ 3	6SG7	V.	V.	0V.	-.4VDC	0V.	92VDC	13VAC	92VDC	-
‡ 4	6SH7	0V.	V.	0V.	-.5VDC	0V.	30VDC	13VAC	43VDC	-
5A	6S8GT	-.5VDC	V.	-.5VDC	-.5VDC	.1VDC	55VDC	0V.	6.6VAC	-.2VDC
‡ 5B	6S8GT	-.5VDC	0V.	-.5VDC	-.5VDC	.1VDC	55VDC	0V.	6.6VAC	-.2VDC
6	25L6GT	250VDC	240VAC	117VDC	115VDC	0V.	124VDC	56VAC	7.3VDC	-
7	5Z4GT	320VDC	320VAC	117VAC	126VDC	117VAC	112VDC	84VAC	126VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6SB7Y	0Ω	22Ω	30KΩ	31KΩ	22KΩ	.0Ω	34Ω	3.8 Me.	-
2	6SG7	0Ω	17Ω	0Ω	3.8 Meg.	0Ω	30KΩ	21Ω	30KΩ	-
‡ 3	6SG7	0Ω	17Ω	0Ω	2.2 Meg.	0Ω	30KΩ	9Ω	30KΩ	-
‡ 4	6SH7	0Ω	3Ω	0Ω	47KΩ	0Ω	7KΩ	9Ω	77KΩ	-
5A	6S8GT	520KΩ	0Ω	100KΩ	1.0KΩ	200KΩ	500KΩ	0Ω	3Ω	15 Meg.
‡ 5B	6S8GT	INF.	0Ω	100KΩ	100KΩ	200KΩ	500KΩ	0Ω	3Ω	15 Meg.
6	25L6GT	31KΩ	35Ω	30KΩ	31KΩ	420KΩ	30KΩ	46Ω	150Ω	-
7	5Z4GT	30KΩ	46Ω	175Ω	30KΩ	175Ω	30KΩ	65Ω	30KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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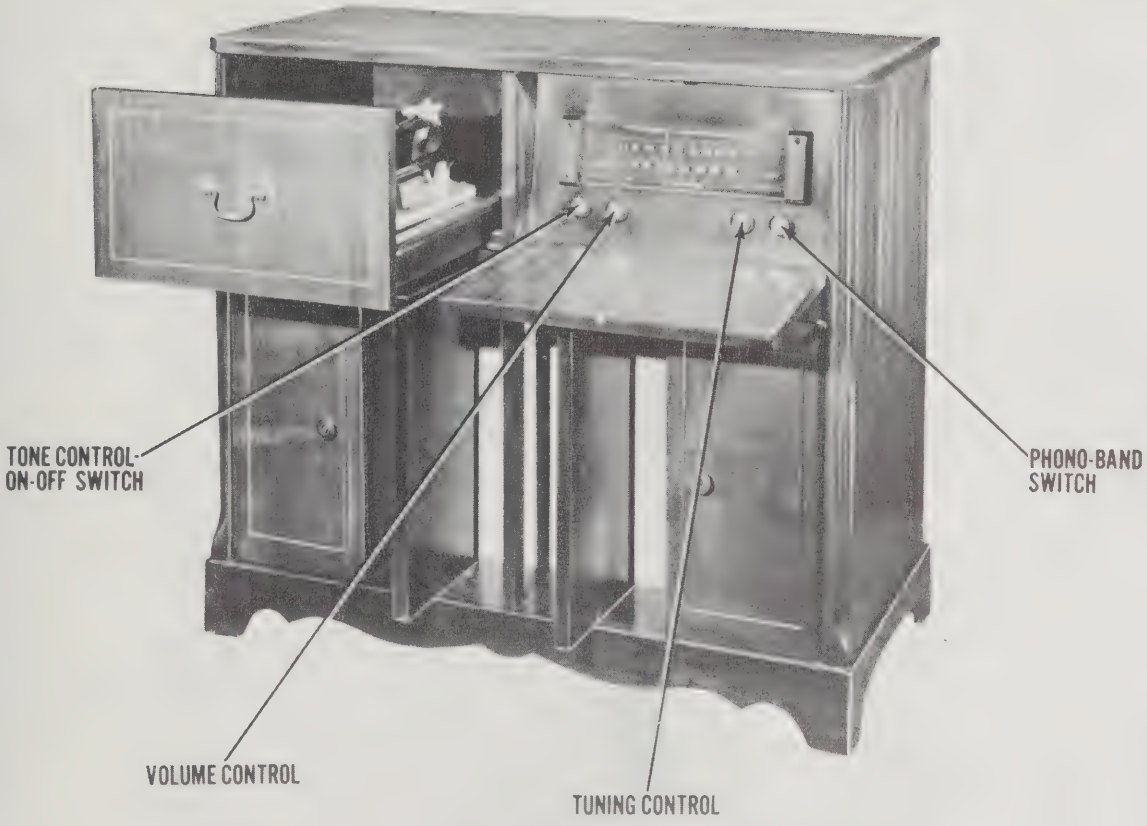
PHOTOFACT* Folder

*TRADE MARK

MANTOLA MODEL
R-78162

MANTOLA MODEL
R-78162



MANTOLA MODEL
R-78162

MANTOLA MODEL R-78162

TRADE NAME	Mantola, Model R-78162
SUPPLIER	The B. F. Goodrich Co., 500 S. Main St., Akron, Ohio
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6BA6 RF Amp., 6BE6 Converter, 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6SQ7 AM Det.-AVC-AF, 6H6 FM Det., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.80 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC FREQ. MOD. 87.25-108.75MC

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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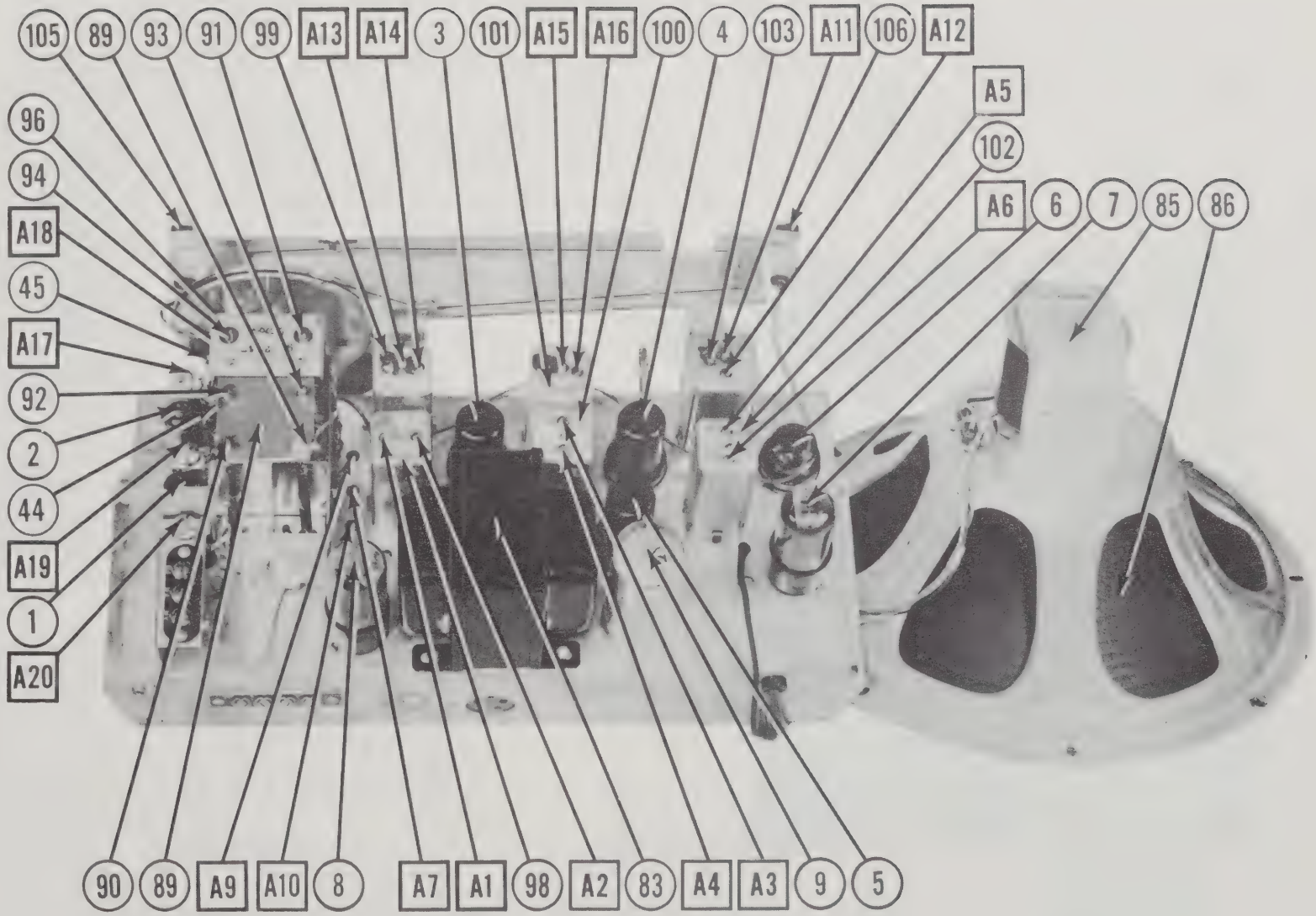
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MANTOLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	1st IF Amp.	6SG7	6SG7	8BK	
4	2nd IF Amp.	6SG7	6SG7	8PK	
5	AM Det.-AVC-AF	6S47	6S47	8A	
6	FM Det.	6H6	6H6	7A	
7	Power Output	6V6GT	6V6GT	7AC	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	MANTOLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	30	400	A-57950	AF862J4A	UP43145C	DY-403	EL-424	▬ Filter
B	30	400						■ "
C	15	400						▲ "
D	20	25						Cathode Bypass
10	4	150	B-55520-1	PRS150-4	BR415	M-4-450	UT-41	Stabilizing Cap.
11	.05	400	BC31B503	484-05	DT4S5	MPH-4-05	TC-15	Line Filter
12	.01	600	BD610103	684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
13	.005	600	BD610502	684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
14	.05	400	BD410503	484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
15	.01	600	BD610103	684-01	DT6S1	ST-6-01	TC-11	" "
16	.01	600	BD610103	684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
17	.02	400	BD410203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
18	.001	600	BD610102	684-001	DT6D1	ST-6-001	TC-21	Tone Compensation
19	.001	600	BD610102	684-001	DT6D1	ST-6-001	TC-21	De-emphasis
20	.1	400	BD410104	484-.1	DT4P1	ST-4-1	TC-1	2nd IF Plate Decoupling
21	.02	400	BD410203	484-02	DT4S2	ST-4-02	TC-12	2nd IF Screen Bypass
22	.02	400	BD410203	484-02	DT4S2	ST-4-02	TC-12	2nd IF Cathode Bypass
23	.1	400	BD410104	484-.1	DT4P1	ST-4-1	TC-1	2nd IF Plate Decoupling
24	.02	400	BD410203	484-02	DT4S2	ST-4-02	TC-12	2nd IF Screen Bypass
25	.02	400	BD410203	484-02	DT4S2	ST-4-02	TC-12	2nd IF Screen Bypass
26	.05	200	BD210503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
27	.1	400	BD410104	484-.1	DT4P1	ST-4-1	TC-1	Conv. Plate Decoupling
28	.1	200	BD210104	484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
29	150	500	BM74A151	1468-00015	5W5T15	MO.5-315	1FM-315	AF Plate Bypass
30	56	500	B-58902-11					Diode Load Cap.
31	330	500	BM64A331	1468-0003	5W5T3	MO.5-33	1FM-33	2nd IF Plate Decoupling
32	330	500	BM64A331	1468-0003	5W5T3	MO.5-33	1FM-33	RF Bypass
33	330	500	BM64A331	1468-0003	5W5T3	MO.5-33	1FM-33	1st IF Plate Decoupling
34	330	500	BM64A331	1468-0003	5W5T3	MO.5-33	1FM-33	RF Bypass
35	330	500	BM64A331	1468-0003	5W5T3	MO.5-33	1FM-33	Conv. Plate Decoup.
36	47	300	B-58900-27	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
37	5000	300	B-58802-11	1467-005	1D5D5	MW.5-25	1FM-25	Osc. Feedback-Cer.
38	1000	300	BM74A102	1467-001	1W5D1	MW.5-21	1FM-21	Fixed Padder
39	47	500	B-58900-6	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling
40	220	500	BM74A221	1468-00025	5W5T25	MO.5-325	1FM-325	" "
41	1000	300	BM74A102	1467-001	1W5D1	MW.5-21	1FM-21	RF Screen Bypass
42	100	300	BM74A101	1468-0001	5W5T1	MO.5-31	1FM-31	RF Cathode Bypass-Cer.
43	1000	300	BM64A911	1467-001	1W5D1	MW.5-21	1FM-21	Osc. Feedback
44	15	300	B-58803-16				MS-415	Fixed Trimmer
45	20	300			5R5Q2	MOS.5-42	MS-42	Osc. Feedback
46	100	500	B-58801-18	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
110	.05	400	BB-410503	484-05	DT4S5	ST-4-05	TC-15	RF Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	MANTOLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
47A	2 Meg.	½	B-58218-1		A7-119	Volume Control tapped @ 300KΩ
B	Shaft				KSS-3	Attach to 47A per instructions
48A	1 Meg.	½	B-58219-1	D11-137	A1-81-S	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 48A per instructions
C	Switch		" "	41	Sw-2	" " " " "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	MANTOLA PART No.	IRC PART No.	IDENTIFICATION CODES
49	220KΩ	½	BR17B224	BTS-220K	Red-Red-Yl. RF Grid
50	47Ω	½	BR16B470	BW-½-47	Yl.-Vi.-Blk. RF Cathode
51	33KΩ	½	BR17B333	BTS-33K	Or.-Or.-Or. RF Screen Dropping
52	2200Ω	½	BR17B222	BTS-2200	Red-Red-Red AM RF Plate Load
53	100KΩ	½	BR17B104	BTS-100K	Br.-Blk.-Yl. Converter Screen Dropping
54	6800Ω	1	BR16E682	BTA-6800	Blue-Gray-Red Decoupling
55	12KΩ	1	BR16E123	BTA-12K	Br.-Red-Or. Converter Screen Dropping
56	2200Ω	½	BR17B222	BTS-2200	Red-Red-Red Converter Plate Decoupling
57	220KΩ	½	BR17B224	BTS-220K	Red-Red-Yl. Converter Grid
58	22KΩ	½	BR17B223	BTS-22K	Red-Red-Or. Oscillator Grid
59	56Ω	½	BR16B560	BW-½-56	Grn.-Blue-Blk. 1st IF Cathode
60	33KΩ	½	BR17B333	BTS-33K	Or.-Or.-Or. 1st IF Screen Dropping
61	2200Ω	½	BR17B222	BTS-2200	Red-Red-Red 1st IF Plate Decoupling
62	1 Meg.	½	BR17B105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
63	56Ω	½	BR16B560	BW-½-56	Grn.-Blue-Blk. 2nd IF Cathode
64	33KΩ	½	BR17B333	BTS-33K	Or.-Or.-Or. 2nd IF Screen Dropping
65	2200Ω	½	BR17B220	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
66	47KΩ	½	BR17B473	BTS-47K	Yl.-Vi.-Or. De-emphasis
67	15KΩ	½	BR17B153	BTS-15K	Br.-Grn.-Or. Ratio Detector Diode Load
68	15KΩ	½	BR17B153	BTS-15K	Br.-Grn.-Or. " " " "
69	470KΩ	½	BR17B474	BTS-470K	Yl.-Vi.-Yl. AVC Network
70	1 Meg.	½	BR17B105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
71	1 Meg.	½	BR17B105	BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
72	470KΩ	½	BR17B474	BTS-470K	Yl.-Vi.-Yl. Diode Load
73	470KΩ	½	BR17B474	BTS-470K	Yl.-Vi.-Yl. Series Phono
74	100KΩ	½	BR17B104	BTS-100K	Br.-Blk.-Yl. Tone Compensation
75	33KΩ	½	BR17B333	BTS-33K	Or.-Or.-Or. " "
76	6.8 Meg.	½	BR17B685	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
77	330KΩ	½	BR17B334	BTS-330K	Or.-Or.-Yl. AF Plate Load
78	470KΩ	½	BR17B474	BTS-470K	Yl.-Vi.-Yl. Output Grid
79	100KΩ	½	BR17B104	BTS-100K	Br.-Blk.-Yl. Output Grid
80	270Ω	1	BR16E271	BW-1-270	Red-Vi.-Br. Output Cathode
81	10KΩ	1	BR17E103	BTA-10K	Br.-Blk.-Or. Tone Compensation
82	3.9Ω	½		BW-½-3.9	Or.-White-Gold Filament Dropping
107	470KΩ	½	BR17B474	BTS-470K	Yl.-Vi.-Yl. AVC Network

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	MANTOLA PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
83	117V AC @ .8A	660V CT @ 123A DC	5.1V AC @ 2.0A	6.4V AC @ 2.3A	C-57934	P-6013†	T22R05†	P-3155

†Use universal mounting brackets.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	MANTOLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
84	4000Ω	3.3Ω	490Ω	.8Ω	B-57967-1	A-3849	T22S87	A-2902	

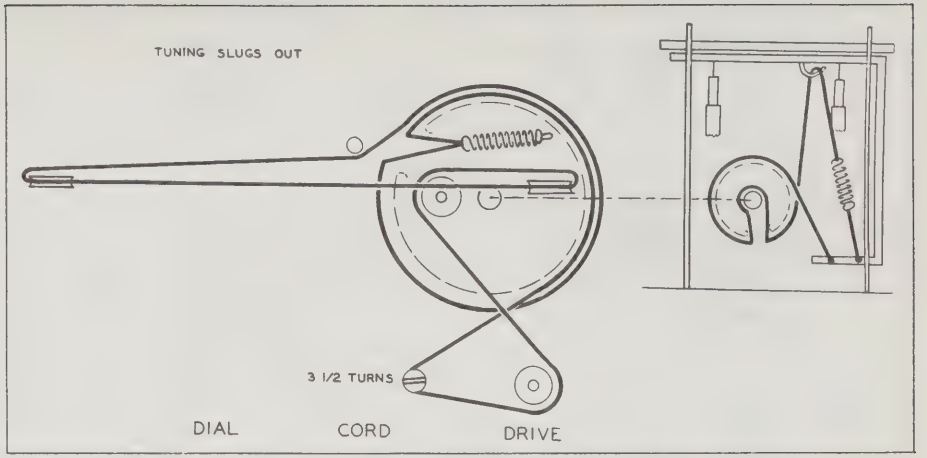
SPEAKER

ITEM No.	RATINGS		MANTOLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
85	450Ω	3.3Ω	D-58228-1		12E6‡	‡Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
86	11-3/4"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MANTOLA PART No.	REPLACEMENT DATA MEISSNER PART No.	
87	BC Loop Ant.	.1Ω	.8Ω			
88	FM Dip. "		0Ω			
89	AM Ant.Coil		23.5Ω			Items 89, 90, 91, 92, 93, 94& 96 are part of tuner.
90	FM " "		.1Ω			
91	AM RF Coil		10.8Ω			
92	FM RF "		0Ω			
93	AM Osc.Coil		4.5Ω			
94	FM " "		0Ω			
95	BC Osc.Trkg. Shunt Coil		4.3Ω	B57926		
96	FM Osc. Shunt Coil		0Ω			
97	BC Osc. Trkg. Coil		1.2Ω	B57933		
98	AM Input IF	12Ω	12.1Ω	B57954-1	16-6658	
99	FM " "	.3Ω	.1Ω	B57972-1		
100	AM 2nd IF	11.9Ω	11Ω	B57958-1	16-6659	
101	FM " "	.4Ω	.1Ω	B57976-1		
102	AM Output IF	12.3Ω		B57963-1	16-6670	
103	Ratio Det.	.6Ω	.2Ω	B57994-1		
104	RF Choke		1.5Ω	A57931		



DIAL LIGHT

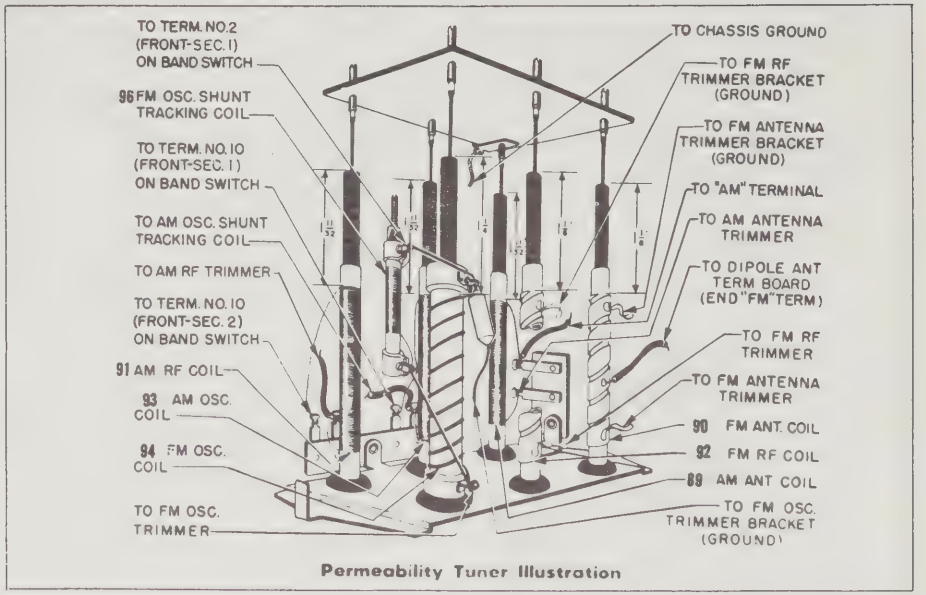
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MANTOLA PART No.	REPLACEMENT DATA	INSTALLATION NOTES
105	Bayonet	6-8	0.15	Brown	A-6158		Type 47
106	"	6-8	0.15	"	A-6158		" "

PHONO CARTRIDGE

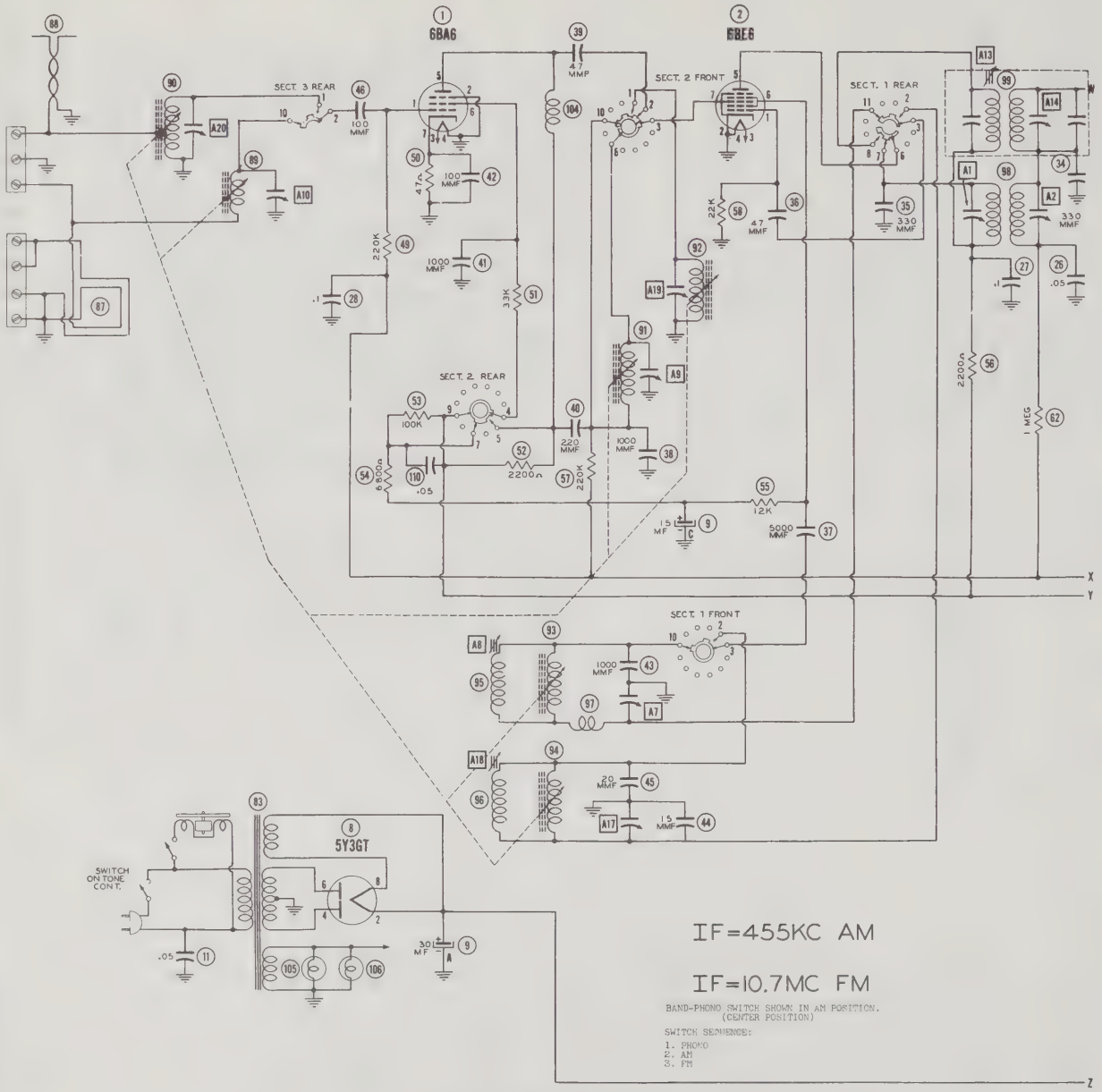
ITEM No.	REPLACEMENT DATA MANTOLA PART No.	REPLACEMENT DATA ASTATIC PART No.	REMARKS
107		L-70-A	L70 original part.

MISCELLANEOUS

ITEM No.	PART NAME	MANTOLA PART No.	NOTES
1[illegible]	Switch	B-57923-1	Band-Phono
A7	Trimmer Strip	B-57942-1	BC Osc. Adj.
A9	Trimmer Strip	B-57942-1	BC RF Adj.
A10	Trimmer Strip	B-57942-1	BC Ant. Adj.
A17	Trimmer	B-57939-1	FM Osc. Adj.
A19	"	B-57939-1	FM RF Adj.
A20	"	B-57939-2	FM Ant. Adj.
	Dial	C-5[illegible]17-1	Crystal & Indicator
	Dial Pointer	A-[illegible]216-1	


TO TERM. NO.2 (FRONT-SEC. 1) ON BAND SWITCH
96 FM. OSC. SHUNT TRACKING COIL
TO TERM. NO. 10 (FRONT-SEC. 1) ON BAND SWITCH
TO AM OSC. SHUNT TRACKING COIL
TO AM RF TRIMMER
TO TERM. NO. 10 (FRONT-SEC. 2) ON BAND SWITCH
91 AM. RF COIL
93 AM OSC. COIL
94 FM OSC. COIL
TO FM OSC. TRIMMER
TO CHASSIS GROUND
TO FM RF TRIMMER BRACKET (GROUND)
TO FM ANTENNA TRIMMER BRACKET (GROUND)
TO "AM" TERMINAL
TO AM ANTENNA TRIMMER
TO DIPOLE ANT TERM BOARD (END "FM" TERM)
TO FM RF TRIMMER
TO FM ANTENNA TRIMMER
90 FM ANT. COIL
92 FM RF COIL
89 AM ANT COIL
TO FM OSC. TRIMMER BRACKET (GROUND)
Permeability Tuner Illustration

DATE 8/48-4813-11 SET #43-FOLDER #11



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AC	-1.1VAC	0.	6.4VAC	0V.	240VDC	95VDC	.4VDC	-
2	6BE	-.4VDC	0.	6.4VAC	0V.	250VDC	115VDC	0V.	-
3	6S7	.4VDC	0.	6.4VAC	0V.	.4VDC	1.4VDC	.4VDC	240VDC
4	6S7	.4VDC	0.	6.4VAC	0V.	.4VDC	1.8VDC	.4VAC	250VDC
5	6SQ7	.4VDC	0.	6.4VAC	0V.	-.4VDC	.8VDC	6.4VAC	0V.
‡ 6	6N6	.4VDC	.4VAC	.4VDC	.8VDC	0V.	0V.	0V.	0V.
7	6V6GT	0V.	.4VAC	1.4VDC	280VDC	CV	0V.	0V.	14VDC
8	5Y3GT	0.	0.	0.	0.	330VAC	0V.	330VAC	0V.	310VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AC	1.0 Meg.	0Ω	.1Ω	0Ω	170KΩ	170KΩ	1.0 Meg.	-
2	6BE	2.2KΩ	0Ω	.1Ω	0Ω	150KΩ	170KΩ	1.0 Meg.	-
3	6S7	0Ω	0Ω	0Ω	2.5 Meg.	0Ω	180KΩ	.1Ω	190KΩ
4	6S7	0Ω	0Ω	0Ω	1.2Ω	0Ω	1.0KΩ	.1Ω	1.0KΩ
5	6SQ7	0Ω	1.0 Meg.	0Ω	INF.	470KΩ	470KΩ	.1Ω	-
‡ 6	6N6	0Ω	.1Ω	30KΩ	1.4 Meg.	1.4 Meg.	30KΩ	0Ω	.1Ω
7	6V6GT	INF.	.1Ω	150KΩ	190KΩ	470KΩ	470KΩ	0Ω	470KΩ
8	5Y3GT	INF.	150KΩ	INF.	0Ω	INF.	0Ω	INF.	190KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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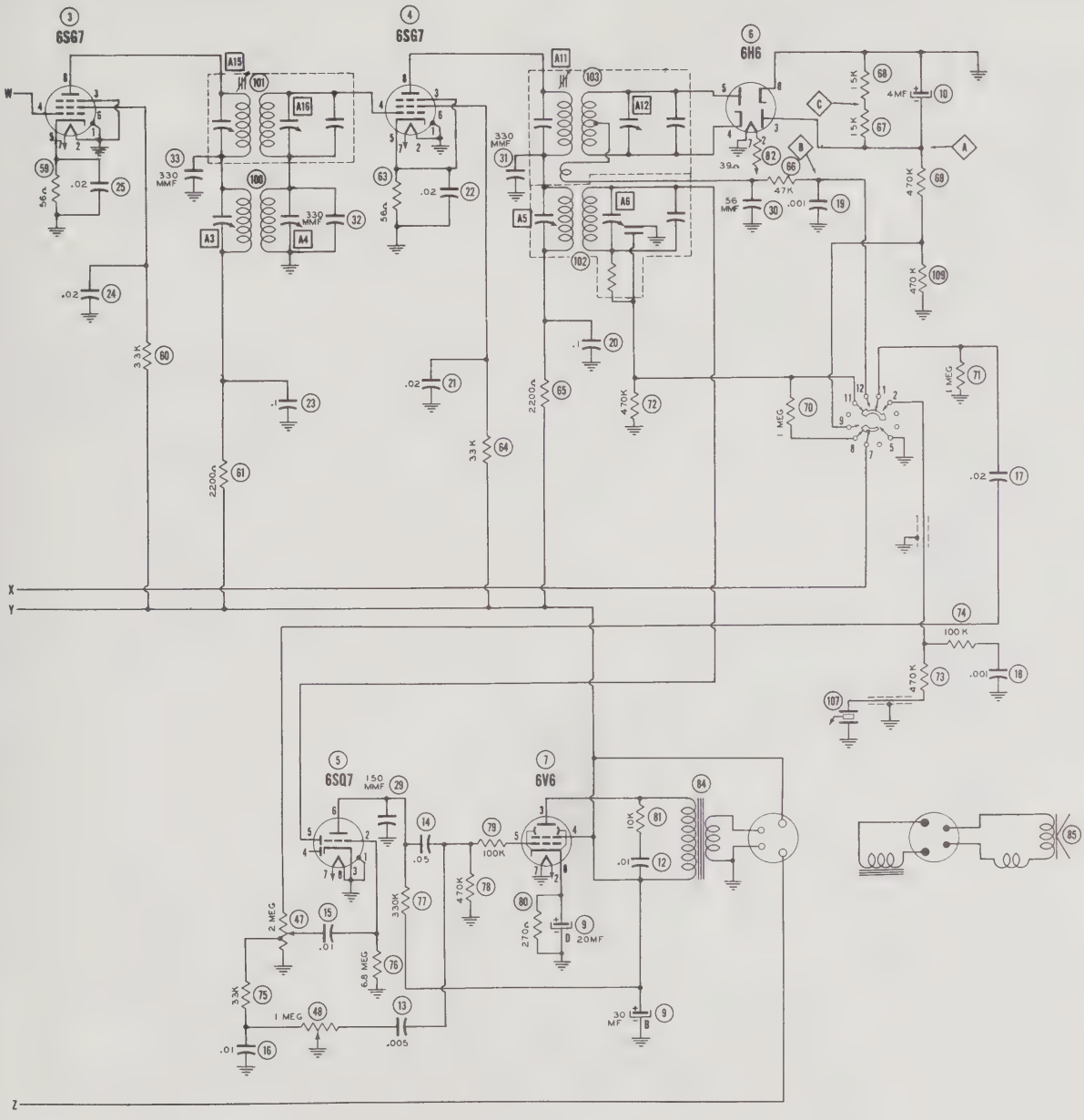

STAGE GAIN MEASUREMENTS		
RF GRID TO CONVERTER GRID	10X	600KC
CONVERTER GAIN	7X	IN 600KC OUT 455KC
1st IF TRANS.	.56X	455KC
1st IF TUBE	120X	455KC
2nd IF TRANS.	.22X	455KC
2nd IF TUBE	120X	455KC
3rd IF TRANS.	.56X	455KC
AUDIO	3.5X	400~
OUTPUT	.89X	400~

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning slugs fully in and set pointer to 1st index mark at right side of pointer saddle guide.

Before attempting alignment check for correct positions of tuning slugs per tuner illustration.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

In Step 5 AM loop must be connected.

In Step 3 if 1620KC signal comes in below 1620KC reference mark (last mark at right side of pointer saddle guide) turn A8 out a turn and repeat Step 2. If when tuning slugs are turned completely out the signal is not received turn A8 in a turn and repeat Step 2. Repeat steps 2 & 3 until calibration is correct.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	455KC	BC	Tuning slugs out completely.	Across voice coil	A1,A2, A3,A4, A5,A6.	Adjust for maximum output
2	.1 MFD.	High side to Pin 1 (grid) 6BA6. Low side to chassis.	535KC	"	Tuning slugs in completely	"	A7	" " " "
3	.1 MFD.	"	1620KC	"	Tuning slugs out completely.	"	A8	Adjust per prealignment instructions.
4	.1 MFD.	"	535KC	"	Tuning slugs in completely	"	A9	Adjust for maximum output.
5		Loop	1400KC	"	Tune for maximum output.	"	A10	Fashion loop of several turns of wire and radiate signal into loop or receiver. Adjust for maximum output.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

In Step 10 if signal comes in below 108.75MC reference mark (same as 1620KC mark) turn A18 out half a turn and repeat Step 9. If signal is not received turn A18 in half a turn and repeat Step 9. Repeat steps 9 & 10 until calibration is correct.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.1 MFD.	High side to Pin 4 (grid) 6SG7 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	FM	Tuning slugs fully out.	DC probe to Point (A). Common to chassis	A11	Adjust for maximum deflection with an approximate meter reading of 5 volts.
7	.1 MFD.	"	"	"	"	DC probe to Point (B). Common to Point (C)	A12	Adjust for zero deflection.
8	.1 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A13,A14 A15,A16	Adjust for maximum deflection with an approximate meter reading of 5 volts.
9	.1 MFD.	High side to Pin 1 (grid) 6BA6. Low side to chassis.	87.25MC	"	Tuning slugs fully in.	"	A17	Adjust for maximum deflection.
10	.1 MFD.	"	108.75MC	"	Tuning slugs fully out.	"	A18	Adjust per prealignment notes.
11	.1 MFD.	"	87.25MC	"	Tuning slugs fully in.	"	A19	Adjust for maximum deflection.
12	300Ω carbon res.	High side to ungrounded FM terminal of FM Ant. terminal strip through 300Ω. Low side to chassis.	"	"	"	"	A20	"

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

In Step 7 disconnect grid lead from Pin 7 of 6BE6. Connect 100KΩ resistor from Pin 7 to chassis making connections as short as possible.

In Step 10 if coincidence of pattern of Fig. 1 is obtained below 108.75MC reference mark (same as 1620KC mark) turn A18 out half a turn and repeat Step 9. If coincidence of pattern of Fig. 1 is not obtainable turn A18 in half a turn and repeat Step 9. Repeat Steps 9 & 10 until a coincident pattern is obtained at correct calibration points of 87.25MC and 108.75MC.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6	.1 MFD.	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to Chassis.	10.7MC (freq. modulated)	FM	Tuning slugs fully out.	Vertical input to Point (A). Ground to chassis.	A11,A16, A15	Disconnect 4 MFD cap. from Point (A). Adjust A11, A16 & A15 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.1 MFD.	High side to Pin #7 of 6BE6. Low side to chassis.	"	"	"	"	A14, A13	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
8	.1 MFD.	Remove 100KΩ resistor from Step 7 and reconnect grid lead to 6BE6 High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A12	Reconnect 4 MFD cap. to Point (A). Adjust A12 for maximum straightness of crossover lines with crossover occurring at center of pattern of Fig. 2.
9	300Ω carbon res.	High side to ungrounded terminal of FM ant. terminal strip. Low side to chassis.	87.25MC	"	Tuning slugs fully in.	Vertical input to Point (A). Ground to chassis.	A17	Disconnect 4 MFD cap. from Point (A). Adjust A17 for coincidence of pattern per Fig. 1
10	"	"	108.75MC	"	Tuning slugs fully out.	"	A18	Adjust per prealignment instructions.
11	"	"	87.25MC	"	Tuning slugs fully in.	"	A19, A20	Adjust for maximum amplitude. Reconnect 4 MFD cap. to Point (A).

FIG. 1

FIG. 2

MAGNAVOX CHASSIS MODELS
AMP-101A, AMP-101B

TRADE NAME	Magnavox, Chassis Models AMP-101A, AMP-101B
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	AC Operated Power Amplifier
TUBES (SIX)	Types, (4) 6V6GT Power Output, (2) 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING 1.38 Amp. @ 117 Volts AC

VOLTAGE AND RESISTANCE READINGS TAKEN WITH TUNER CHASSIS CR-208B CONNECTED.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6V6GT	0V.	3.15VAC	272VDC	280VDC	0V.	0V.	3.15VAC	17VDC
2	6V6GT	0V.	3.15VAC	272VDC	280VDC	0V.	0V.	3.15VAC	17VDC
3	6V6GT	0V.	3.15VAC	272VDC	280VDC	0V.	0V.	3.15VAC	17VDC
4	6V6GT	0V.	3.15VAC	272VDC	280VDC	0V.	0V.	3.15VAC	17VDC
5	5Y3G	0V.	370VDC	0V.	380VAC	0V.	380VAC	0V.	370VDC
6	5Y3GT	0V.	370VDC	0V.	380VAC	0V.	380VAC	0V.	370VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6V6GT	0Ω	.05Ω	23KΩ	23KΩ	13KΩ	100KΩ	.05Ω	125Ω
2	6V6GT	0Ω	.05Ω	23KΩ	23KΩ	13KΩ	100KΩ	.05Ω	125Ω
3	6V6GT	0Ω	.05Ω	23KΩ	23KΩ	13KΩ	10KΩ	.05Ω	125Ω
4	6V6GT	0Ω	.05Ω	23KΩ	23KΩ	13KΩ	10KΩ	.05Ω	125Ω
5	5Y3GT	INF.	23KΩ	INF.	390Ω	INF.	380Ω	INF.	23KΩ
6	5Y3GT	INF.	23KΩ	INF.	390Ω	INF.	380Ω	INF.	23KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX CHASSIS MODELS AMP-101A, AMP-101B

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Power Output	6V6GT	6V6GT	7AC	
2	" "	6V6GT	6V6GT	7AC	
3	" "	6V6GT	6V6GT	7AC	
4	" "	6V6GT	6V6GT	7AC	
5	Rectifier	5Y3GT	5Y3GT	5T	
6	"	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	450	27002302	AF22J	UP15D145#	DY-3x15-450#	EL-344#	■ Filter
B	10	450		PRS450/30				▲ "
8A	30	450	27002302	AF22J	UP15D145#	DY-3x15-450#	EL-344#	■ "
B	10	450		PRS450/30				▲ Cathode Bypass
9	.02	600	250129G3	684-02	DT6S2	MPH-6-02	TC-12	Line Filter
10	.02	600	250129G3	684-02	DT6S2	MPH-6-02	TC-12	" "
11	.02	600	250129G3	684-02	DT6S2	MPH-6-02	TC-12	" "
12	.01	600	250129G2	684-01	DT6S1	ST-6-01	TC-11	Feedback
13	.01	600	250129G2	684-01	DT6S1	ST-6-01	TC-11	"
14	.03	400	250126G4	464-03	DT4S3	ST-4-03	TC-13	Tone Compensation-See Note
15	15	500	250107G93				MS-415	Tone Compensation
16	15	500	250107G93				MS-415	" "

Note-Use in model AMP-101B only.
#-Parallel sections to obtain desired capacity.

RESISTORS

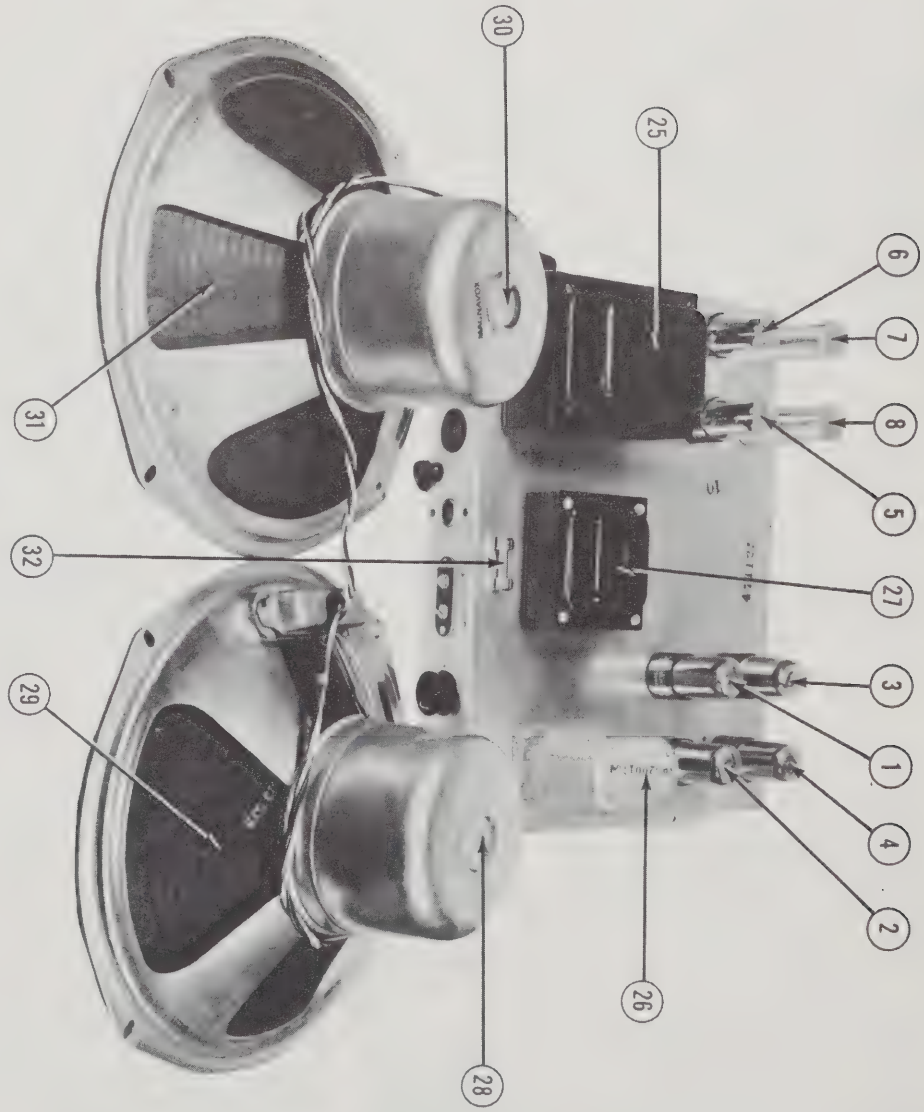
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
17	39KΩ	±	230084G81	BTS-39K	Or.-White-Or. Driver, Transformer Shunt
18	3900Ω	±	230084G69	BTS-3900	Or.-White-Red Tone Comp.
19	10KΩ	±	230084G19	BTS-10K	Br.-Blk.-Or. Output Grid
20	10KΩ	±	230084G19	BTS-10K	Br.-Blk.-Or. " "
21	100KΩ	±	230085G25	BTS-100K	Br.-Blk.-Yl. Feedback
22	100KΩ	±	230085G25	BTS-100K	Br.-Blk.-Yl. "
23	15KΩ	2	230086G20	BT-2-15K	Br.-Grn.-Or. Bleeder
24A	1000Ω	3	240037G1	AB-1000	Filter
B	8000Ω	3	240037G1	AB-8000	Voltage Dropping
C	125Ω	3	240037G1	ABA-150	Output Cathode-See Note

Note-On IRC replacement set slider 25Ω from one end.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MAGNAVOX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
26	117V AC @ 1.3A	700V CT 150m DC	5.2V AC @ 4A	6.3V AC @ 4.2A	230002G1	P-8315	T22R07	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE	DC RES.		MAGNAVOX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI. to SEC.	PRI.	SEC.1					
26	1 to 2.7	230Ω	300Ω	320017G1		T20A19*		*Drill new mounting holes.
	PRI. to SEC.		SEC.2					
	1 to 2.7		300Ω					

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAGNAVOX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
27	500Ω CT	2.5Ω tapped @ 1.5Ω	190Ω CT	.3Ω tapped @ .2Ω	330024G1		T22S74*	A-2905*	*Drill new mounting holes.

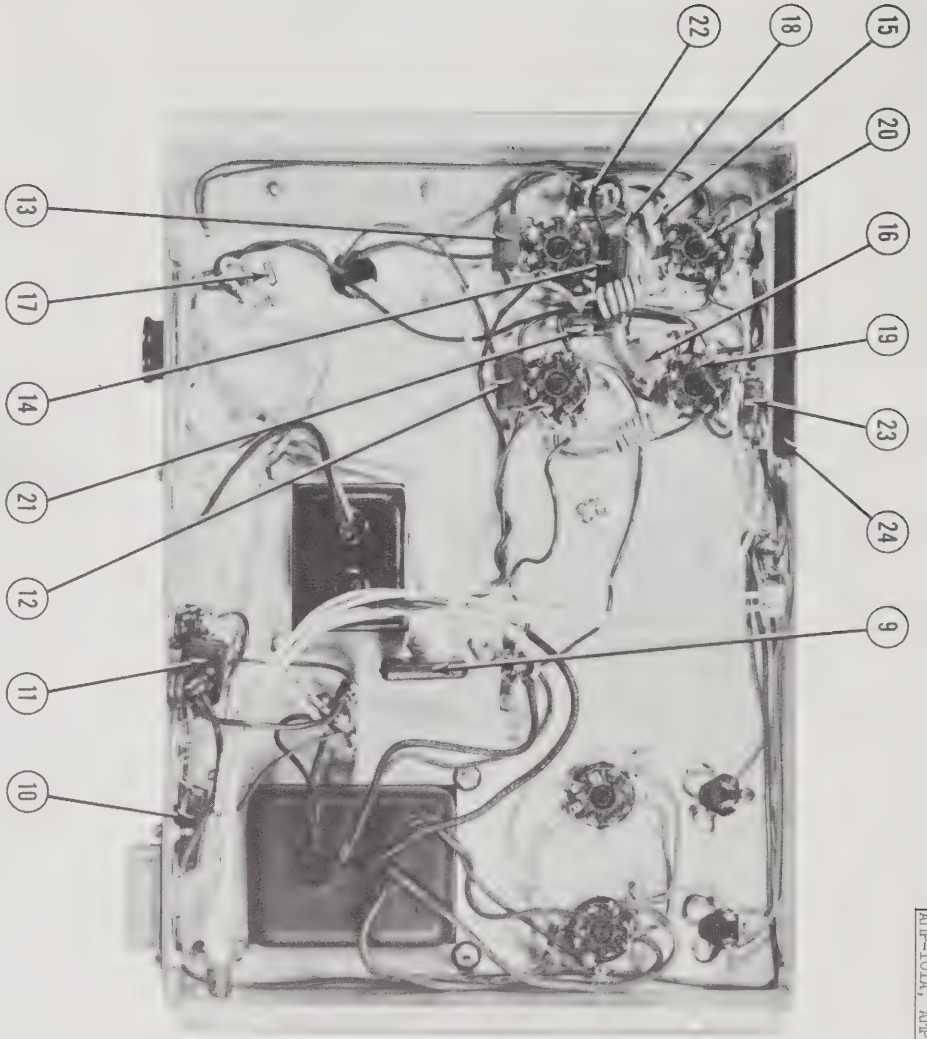
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MAGNAVOX PART No.	JENSEN PART No.	QUAM PART No.	
28	FIELD RES. 250Ω	VC IMP. 5.0Ω	582869			
29	CONE DIA. 11½"	VC DIA. 3/4"				
30	FIELD RES. 250Ω	VC IMP. 5.3Ω	582815			
31	CONE DIA. 11½"	VC DIA. 3/4"				

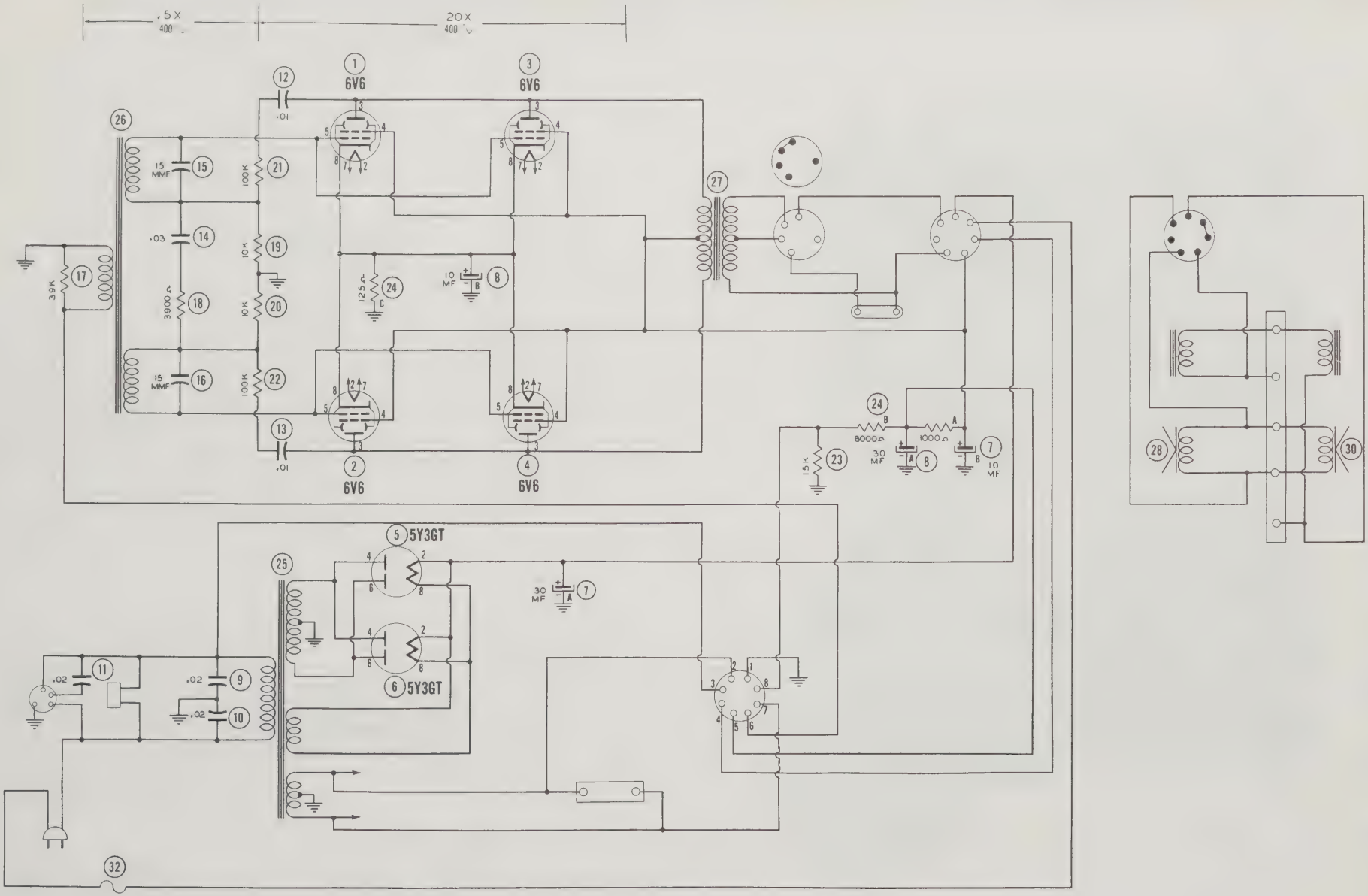
MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
32	Fuse Socket	180157G10 180194G4	3 Amp. Octal

CHASSIS—BOTTOM VIEW



MAGNAVOX CHASSIS MODELS
AMP-101A, AMP-101B



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MAGNAVOX CHASSIS MODEL CR-208B

TRADE NAME	Magnavox, Chassis Model CR-208A, CR-208B
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	Two Band AM Tuner Chassis
TUBES (SEVEN)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6J5 Det.-AVC, 6J5 1st AF Amp., 6J5 2nd AF Amp., 6U5/6G5 Tuning Eye.
POWER SUPPLY	Power Amplifier Chassis such as AMP-101A or AMP-101B (Set #43-Folder #12)
TUNING RANGE—BROADCAST	530-1610KC SHORT WAVE 4.9-18.1MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Treble control should be at sharp tune, volume control at maximum, and output of signal generator should be no higher than is necessary to obtain an output reading. Use insulated alignment screwdriver for all adjustments.

In Step 7 if an audio oscillator is not available, turn band switch to BC and tune receiver to a point between two stations on adjacent channels having approximately the same power. If A12 is out of adjustment a 10KC whistle will be heard. Adjust A12 until whistle is at minimum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	250 MMFD	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	BC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	250 MMFD	Ant.-Loop switch in "ant". position. High side of sig. gen. to external antenna terminal. Low side to chassis.	600KC	"	Tune for maximum output.	"	A5	Rock tuning cap. and adjust for maximum output.
3	250 MMFD	"	1400KC	"	1400KC	"	A6	Adjust for maximum output.
4	250 MMFD	"	"	"	Tune for maximum output.	"	A7,A8	Adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.
5	400Ω carbon res.	High side to ext. ant. lead. Low side to chassis.	15MC	SW	15MC	"	A9	Adjust for maximum output. While adjusting A10 two peaks may be obtained. Adjust to peak requiring most capacity.
6	"	"	"	"	Tune for maximum output.	"	A10, A11	Rock tuning cap. and adjust for maximum output.
7		High side to side to phono jack. Low side to chassis.	10,000~ (Audio Gen.)	Phono		"	A12	Turn treble control to full range. Adjust A12 for minimum output. If audio gen. is not available see prealignment instructions for adjustment of A12. Install receiver in cabinet.
8		Ant.-Loop switch in "Loop" position. Use radiation loop.	1400KC	BC	Tune for maximum output.	"	A13	Turn treble control to sharp tune. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

PUSHBUTTON ADJUSTMENTS

1. Turn set on and allow it to warm up for at least fifteen minutes.
2. Loosen each button a few turns.
3. Manually tune in first station selected using tuning eye shadow for accuracy.
4. Holding manual tuning control pressed in firmly push in selected button completely and tighten.
5. To check accuracy of setting tune with manual control to see if station can be tuned in more accurately. If setting is off repeat steps above.
6. To set up the remaining buttons follow the procedure outlined above.

MAGNAVOX CHASSIS MODELS
CR-208A, CR-208B

MAGNAVOX CHASSIS MODELS
CR-208A, CR-208B

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC	6J5	6J5	6Q	
5	1st AF Amp.	6J5	6J5	6Q	
6	2nd AF Amp.	6J5	6J5	6Q	
7	Tuning Eye	6U5/6G5	6U5/6G5	6R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	10	450	27002306	AF22J4A*	UP1045C	DY-10-450/25-50	EL-202	■ 2nd AF Plate Decoup.
B	20	25						▲ 2nd AF Cathode Byp.
9A	10	450	27002306	AF22J4A*	UP1045C	DY-10-450/25-50	EL-202	■ 1st AF Plate Decoup.
B	20	25						▲ 1st AF Cathode Byp.
10	.05	120	25012905	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
11	.008	400	25012G1028	1467-008	1D3D8	MW.3-28	1FM-28	Tone Comp.
12	.006	400		484-006	DT6D6	ST-6-006	TC-26	" "
13	.004	600	250129G7	684-004	DT6D4	ST-6-004	TC-24	" "
14	.1	400	250152G22	484-.1	DT4P1	ST-4-1	TC-1	Audio Coupling
15	.01	600	250152G38	684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
16	.005	400	250129G10	484-005	DT6D5	ST-6-005	TC-25	Tone Comp.
17	.02	600	250129G3	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
18	.01	400	250129G9	484-01	DT4S1	ST-4-01	TC-11	" "
19	.05	120	250129G5	484-05	DT2S5	ST-4-05	TC-15	1st IF Cathode Bypass
20	.05	120	250129G5	484-05	DT2S5	ST-4-05	TC-15	Conv. Cathode Bypass
21	.05	120	250129G5	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
22	.25	400	250152G21	484-.25	DT2P25	ST-2-25	TC-2	RF Bypass Power Supply
23	.25	400	250152G21	484-.25	DT2P25	ST-2-25	TC-2	RF Screen Bypass
24	.05	120	250129G5	484-05	DT2S5	ST-4-05	TC-15	RF Cathode Bypass
25	.05	120	250129G5	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
26	.01	600	250152G38	684-01	DT6S1	ST-6-01	TC-11	Ext. Ant. Coupling
27	510		250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	Tone Comp.
28	220		250159G100	1468-0002	5W5T2	MO.5-32	1FM-32	" "
29	220		250159G100	1468-0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter
30	330	500	250159G88	1468-0003	5W5T3	MO.5-33	1FM-33	FM Input Shunt
31	510		250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	Phono Tone Comp.
32	510		250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	Phono Coupling
33	400		250085G32					Fixed Padder
34	50		250088G25	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
35	4700		250161G24	1467-005	1D5D5	MW.5-25	1FM-25	Grid Leak Cap.
36	4700		250161G24	1467-005	1D5D5	MW.5-25	1FM-25	Grid Leak Cap.

*Omit one section.

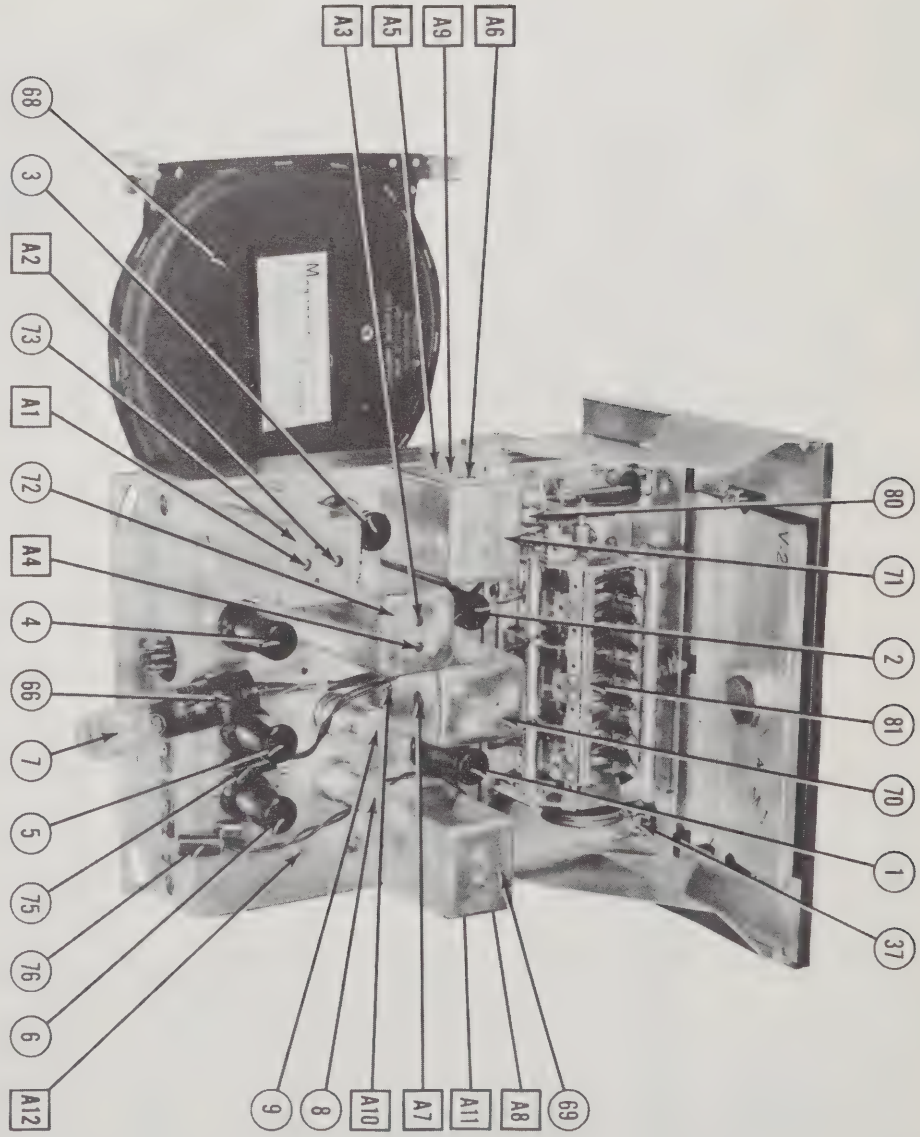
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
37A	1 Meg.	½	220044G15	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 37A per instructions
38A	1 Meg.	½	220045G2	D13-137	M-63-Z	Bass Control
B	Shaft		Not Req.	A	Not Req.	Attach to 38A per instructions
C	Switch		" "	41	SW-A	" " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	IDENTIFICATION CODES
39	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid Leak
40	1500Ω	½	230084G38		Br.-Grn.-Br. RF Cathode
41	4700Ω	½	230084G17	BTS-4700	Yl.-Vi.-Red RF Cathode
42	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. AVC Network

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAGNAVOX PART No.	IRC PART No.	
43	100Ω	½	230084G25	BTS-100K	Br.-Blk.-Yl. " "
44	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid Leak
45	22Ω	½	230084G21	BTS-22K	Red-Red-Or. Audio Output Shunt
46	33Ω	½	230084G22	BTS-33K	Or.-Or.-Or. Osc. Grid
47	150Ω	½	230084G6		Br.-Grn.-Br. Conv. Cathode
48	100Ω	½	230084G7		Br.-Blk.-Br. Parasitic Supp.
49	820Ω	½	230084G61	BTS-820	Gray-Red-Br. IF Cathode
50	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
51	22Ω	½	230084G21	BTS-22K	Red-Red-Or. Diode Filter
52	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. Diode Load
53	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. 1st AF Grid
54	2200Ω	½	230084G15	BTS-2200	Red-Red-Red 1st AF Cathode
55	100KΩ	1	230085G25	BTA-100K	Br.-Blk.-Yl. 1st AF Plate Load
56	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. 1st AF Plate Decoupling
57	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. Phono Tone Comp.
58	1.5 Meg.	½	230084G32	BTS-1.5 Meg	Br.-Grn.-Grn. AVC Network
59	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. " "
60	150KΩ	½	230084G26	BTS-150K	Br.-Grn.-Yl. Tone Comp.
61	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. " "
62	470Ω	½	230084G11	BTS-470	Yl.-Vi.-Br. 2nd AF Cathode
63	15KΩ	1	230085G20	BTA-15K	Br.-Grn.-Or. 2nd AF Plate Load
64	10KΩ	1	230085G19	BTA-10K	Br.-Blk.-Or. 2nd AF Plate Decoup.
65	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. Voltage Dropping
66	560KΩ	½	230084G95	BTS-560K	Grn.-Blue-Yl. Tuning Ind. Plate Load
67	15KΩ	½	230084G19	BTS-10K	Br.-Blk.-Or. Broadcast RF Pri. Shunt

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.
68	Loop Ant. BC		1.3Ω	460582-2	
69A	Ant.Coil BC	15.5Ω	3.5Ω	360254-G3	
B	" " SW		.1Ω		
70A	RF " BC	13.5Ω	2.5Ω	360254-G4	
B	" " SW		.2Ω		
71A	Osc. " BC	.3Ω	3.7Ω	360253-G2	
B	" " SW		.3Ω		
72	Input IF	6.7Ω	6.5Ω	360024-G1	
73	Output IF	7.5Ω	7.5Ω	360025-G1	
74	10KC Filter Coil		225Ω	360244-G1	

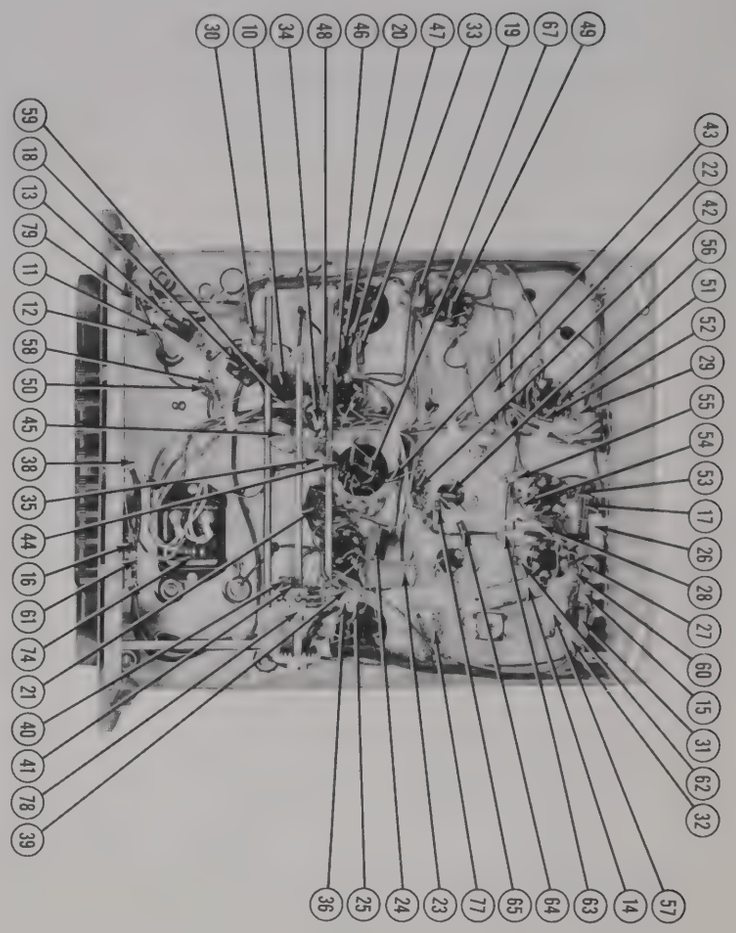
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAGNAVOX PART No.		
75	Bayonet	6-8	0.25	Blue			Type 44
76	"	6-8	0.25	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
77	Switch	160157G1	Ant.-Loop
78	"	160160G2	Band
79	"	160160G1	Treble
80	"	160158G1	Muting (CR-208A)
81	3 Gang Var. Cap.	260054G2	(16-558MMF) each section
A12	Trimmer	259610G2	10KC Adj.
	Dial Glass	150285G1	
	Plug	180427G1	Octal (Amp. Connection)

CHASSIS—BOTTOM VIEW



DIAL CORD REPLACEMENT

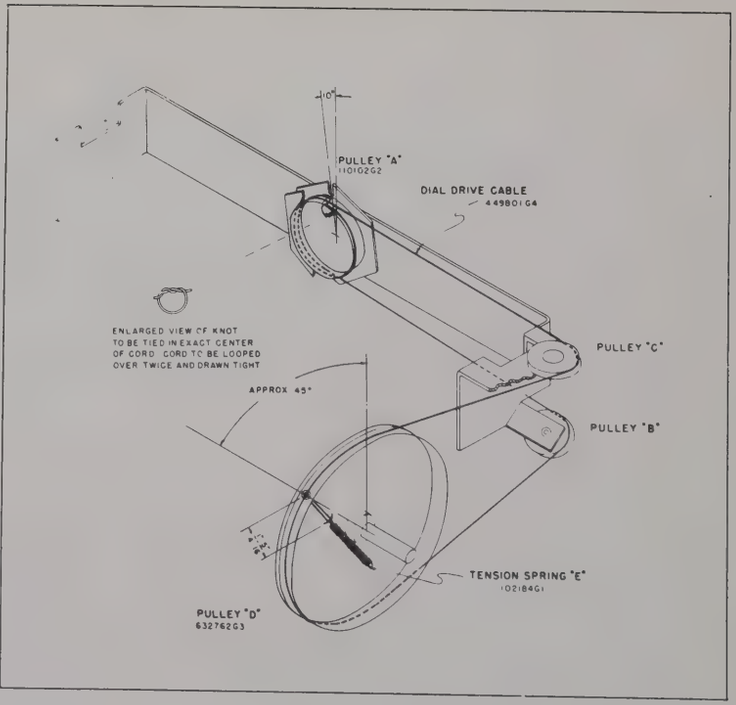
Rotate the brass pulley designated "A" (as in sketch) until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical-see sketch. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

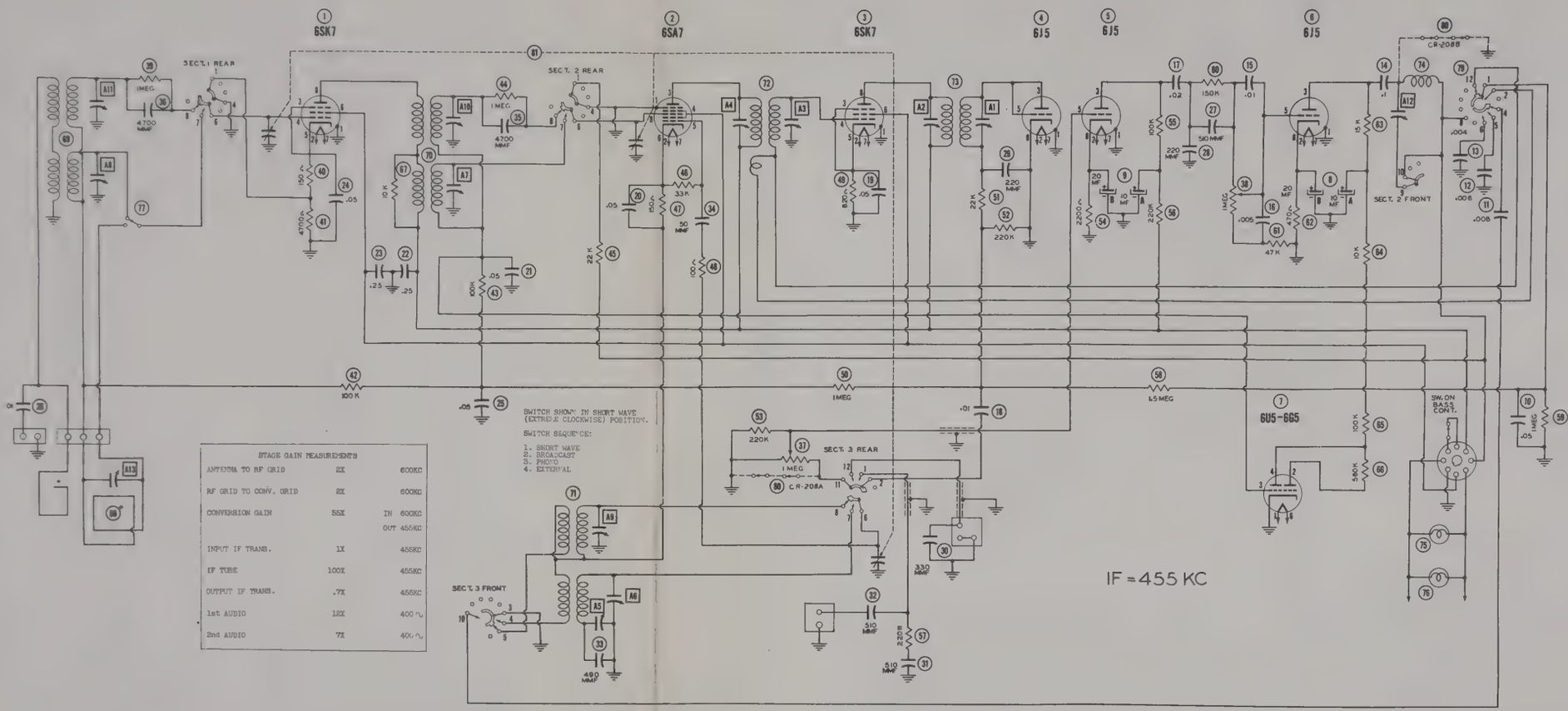
Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D". If this hole is not approximately 45 degrees back from vertical as shown in sketch, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on sketch. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B", around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C", and over the top of pulley "D". Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow 1/4" to 5/16" of cable between the spring and the inside rim of pulley "D". Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.



FOR CONDENSER GANG DRIVE ADJUSTMENT ON MODEL CR-208A, SEE MAGNAVOX MODEL CR-188 SET #18-FOLDER #22.
FOR MODEL CR-208B, SEE MAGNAVOX MODEL CR-198A SET #17-FOLDER #20.



STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	2X	600KC
RF GRID TO CONV. GRID	2X	600KC
CONVERSION GAIN	55X	IN 600KC OUT 455KC
INPUT IF TRANS.	1X	455KC
IF TUBE	100X	455KC
OUTPUT IF TRANS.	.7X	455KC
1st AUDIO	12X	400 ∿
2nd AUDIO	7X	400 ∿

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	3.15VAC	10.5VDC	-.2VDC	10.5VDC	107VDC	3.15VAC	250VDC
2	6SA7	0V.	3.15VAC	250VDC	107VDC	-4.6VDC	2VDC	3.15VAC	-.4VDC
3	6SK7	0V.	3.15VAC	4.6VDC	0V.	4.6VDC	107VDC	3.15VAC	250VDC
4	6J5	0V.	3.15VAC	-.4VDC	-.4VDC	-.4VDC	-.4VDC	3.15VAC	0V.
5	6J5	0V.	3.15VAC	30VDC	0V.	0V.	0V.	3.15VAC	1.3VDC
6	6J5	0V.	3VAC	120VDC	0V.	0V.	120VDC	3.15VAC	3VDC

†TAKEN WITH VACUUM TUBE VOLTMETER.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	.05Ω	480KΩ	1.3 Meg.	480KΩ	14KΩ	.05Ω	21KΩ
2	6SA7	0Ω	.05Ω	21KΩ	14KΩ	33KΩ	150Ω	.05Ω	1.3 Meg.
3	6SK7	0Ω	.05Ω	820Ω	600KΩ	820Ω	14KΩ	.05Ω	21KΩ
4	6J5	0Ω	.05Ω	240KΩ	240KΩ	240KΩ	220KΩ	.05Ω	0Ω
5	6J5	0Ω	.05Ω	340KΩ	INF.	180KΩ	INF.	.05Ω	2200Ω
6	6J5	0Ω	.05Ω	45KΩ	1.2 Meg.	1 Meg.	45KΩ	.05Ω	470Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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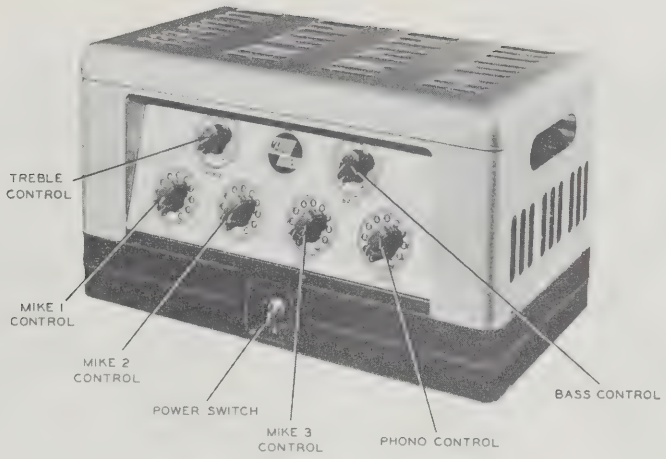

MASCO MODEL MA-25N

TRADE NAME	Masco, Model MA-25N
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th St. Long Island City, N.Y.
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (NINE)	Types, 6J7 1st Mic. Amp. 6J7 2nd Mic. Amp., 6J7 3rd Mic. Amp., 6SC7 Mixer-AF Amp., 6J7 AF Amp., 6SC7 Driver-Phase Inv., (2) 6L6G Power Output, 5V4G Rectifier.
POWER SUPPLY	110-120 Volts AC RATING 1.1 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0V1	23VDC	26VDC	22VDC	0V.	0V.	23VDC	0V.	-.6VDC
2	6J7	0V.	23VDC	18VDC	21VDC	00V.	0V.	23VDC	0V.	-.6VDC
3	6J7	0V.	23VDC	20VDC	22VDC	0V.	0V.	23VDC	0V.	-.7VDC
4	6SC7	0V.	70VDC	0V.	0V.	70VDC	2.4VDC	23VDC	23VDC	-
5	6J7	0V.	23VDC	55VDC	55VDC	55VDC	0V.	23VDC	4.4VDC	0V.
6	6SC7	0V.	110VDC	0V.	0V.	120VDC	3.1VDC	23VDC	23VDC	-
7	6L6G	0V.	23VDC	400VDC	310VDC	0V.	0V.	23VDC	23VDC	-
8	6L6G	0V.	23VDC	400VDC	310VDC	0V.	0V.	23VDC	23VDC	-
9	5V4G	0V.	410VDC	0V.	350VAC	0V.	350VAC	0V.	410VDC	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0Ω	210Ω	340KΩ	1.1 Meg.	0Ω	INF.	210Ω	0Ω	15 Meg.
2	6J7	0Ω	210Ω	340KΩ	1.1 Meg.	0Ω	INF.	210Ω	0Ω	15 Meg.
3	6J7	0Ω	210Ω	340KΩ	1.1 Meg.	0Ω	INF.	210Ω	0Ω	15 Meg.
4	6SC7	0Ω	240KΩ	140KΩ	140KΩ	240KΩ	2.2KΩ	210Ω	210Ω	-
5	6J7	0Ω	210Ω	130KΩ	130KΩ	130KΩ	INF.	210Ω	2.2KΩ	27KΩ
6	6SC7	0Ω	140KΩ	8.2KΩ	270KΩ	140KΩ	1KΩ	210Ω	210Ω	-
7	6L6G	0Ω	210Ω	12.5KΩ	10KΩ	280KΩ	INF.	210Ω	200Ω	-
8	6L6G	0Ω	210Ω	12.5KΩ	10KΩ	270KΩ	INF.	210Ω	200Ω	-
9	5V4G	INF.	12.5KΩ	INF.	45Ω	INF.	50Ω	INF.	12.5KΩ	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

MASCO MODEL MA-20N

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	1st Mic. Amp.	6J7	6J7	7R	
2	2nd Mic. Amp.	6J7	6J7	7R	
3	3rd Mic. Amp.	6J7	6J7	7R	
4	Mixer AF Amp.	6SC7	6SC7	8S	
5	AF Amp.	6J7	6J7	7R	
6	Driver-Phase Inv.	6SC7	6SC7	8S	
7	Power Output	6L6G	6L6G	7AC	
8	" "	6L6G	6L6G	7AC	
9	Rectifier	5V4G	5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10	16	450		PRS450/16	EZ1645	M-16-450	UT-16	Filter
11	16	450		PRS450/16	EZ1645	M-16-450	UT-16	"
12A	8	450		PRSA450/8-8	EZ8845	DH-2X8-450	UT-88	Decoupling-Red
B	8	450					"	"
13	8	450		PRS450/8	BR845	M-8-450	UT-8	"
14	50	50		PRS50/50	BR505	M-50-50	TA-550	Cathode Bypass
15	50	50		PRS50/50	BR505	M-50-50	TA-550	" " -See Note
16	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Audio Coupling
17	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
18	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
19	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
20	.05	600		684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
22	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
23	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
24	.1	600		684-.1	DT6P1	ST-6-1	TC-1	AF Screen Bypass
25	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" " "
26	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" " "
27	.005	600		684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
28	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
29	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
30	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Tone Comp.
31	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	" "
32	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	" "

Note-Not used in all models.

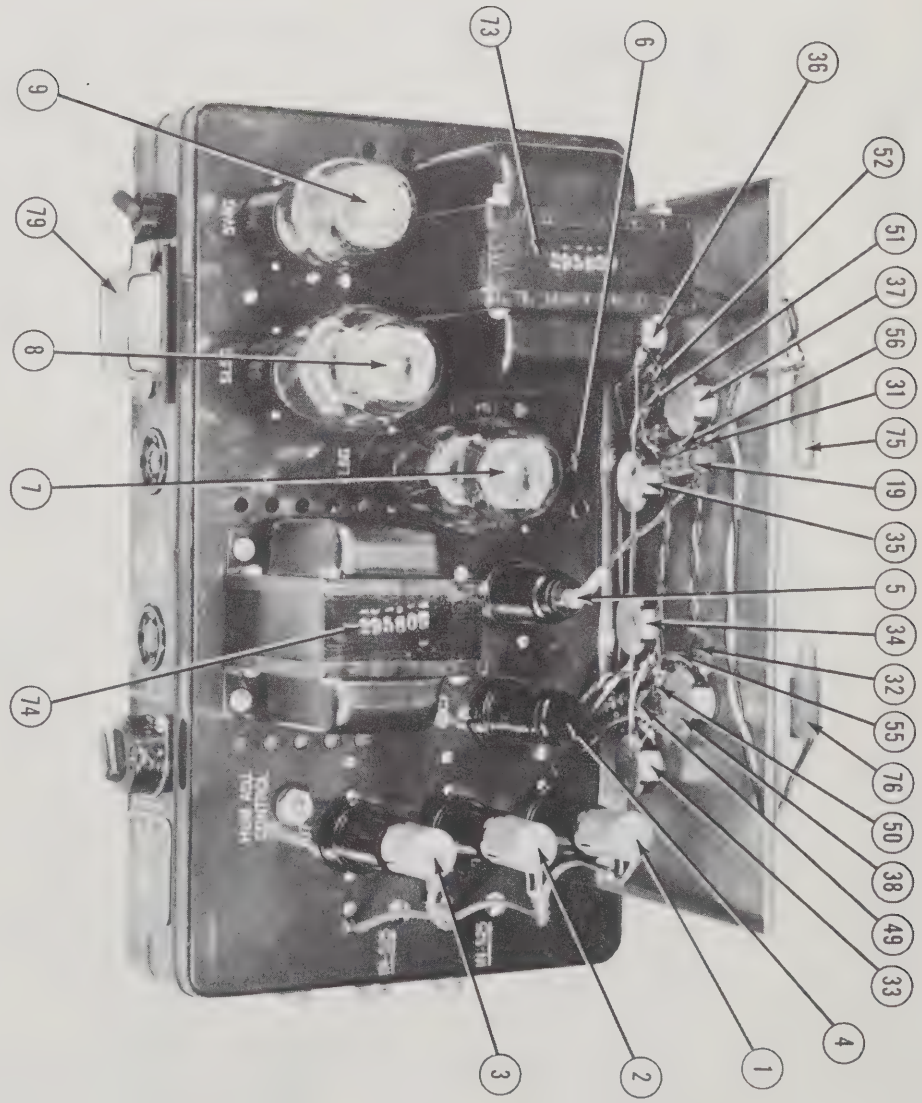
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
33A	500KΩ	½		D13-133	M-60-Z	Mike 1 Control
B	Shaft			A	Not Req.	Attach to 33A per instructions
34A	500KΩ	½		D13-133	M-60-Z	Mike 2 Control
B	Shaft			A	Not Req.	Attach to 34A per instructions
35A	500KΩ	½		D13-133	M-60-Z	Mike 3 Control
B	Shaft			A	Not Req.	Attach to 35A per instructions
36A	500KΩ	½		D13-133	M-60-Z	Phono Control
B	Shaft			A	Not Req.	Attach to 36A per instructions
37A	500KΩ	½		D13-133	M-60-Z	Bass Control
B	Shaft			A	Not Req.	Attach to 37A per instructions
38A	500KΩ	½		D13-133	M-60-Z	Treble Control
B	Shaft			A	Not Req.	Attach to 38A per instructions
39	50Ω	1		W-50	43-50	Hum Bal. Control.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	IDENTIFICATION CODES
40	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue 1st Mic. Amp. Grid
41	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue 2nd Mic. Amp. Grid
42	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue 3rd Mic. Amp. Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
43	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 1st Mic. Amp. Screen Dropping
44	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 2nd Mic. Amp. Screen Dropping
45	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 3rd Mic. Amp. Screen Dropping
46	270KΩ	½		BTS-270K	Red-Vi.-Yl. 1st Mic. Amp. Plate Load
47	270KΩ	½		BTS-270K	Red-Vi.-Yl. 2nd Mic. Amp. Plate Load
48	270KΩ	½		BTS-270K	Red-Vi.-Yl. 3rd Mic. Amp. Plate Load
49	270KΩ	½		BTS-270K	Red-Vi.-Yl. Isolation
50	270KΩ	½		BTS-270K	Red-Vi.-Yl. "
51	270KΩ	½		BTS-270K	Red-Vi.-Yl. "
52	270KΩ	½		BTS-270K	Red-Vi.-Yl. "
53	2200Ω	½		BTS-2200	Red-Red-Red 1st AF Cathode
54	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
55	270KΩ	½		BTS-270K	Red-Vi.-Yl. Tone Compensation
56	27KΩ	½		BTS-27K	Red-Vi.-Or. " "
57	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Decoupling
58	2200Ω	½		BTS-2200	Red-Red-Red 2nd AF Cathode
59	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 2nd AF Plate Load
60	270KΩ	½		BTS-270K	Red-Vi.-Yl. 3rd AF Grid
61	1000Ω	½		BTS-1000	Br.-Blk.-Red 3rd AF Cathode
62	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 3rd AF Plate Load
63	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
64	8200Ω	½		BTS-8200	Gray-Red-Red Phase Inverter Grid
65	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Decoupling
66	270KΩ	½		BTS-270K	Red-Vi.-Yl. Output Grid
67	270KΩ	½		BTS-270K	Red-Vi.-Yl. " "
68	200Ω	10		AB-200	Output Cathode
69	2500Ω	10		AB-2500	Filter
70	10KΩ	20		DG-10K	Bleeder
71	27KΩ	½		BTS-27K	Red-Vi.-Or. Decoupling
72	270KΩ	½		BTS-270K	Red-Vi.-Yl. Feedback

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
73	117V AC @ 1.1A	700V CT .14A DC	5.2V AC @ 2.0A	6.4V AC @ 4.2A	P-25-A	P-4081#	T22R33#*	P-3155#*

#Add series resistor to reduce plate voltage.
*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
74	7000Ω CT	4Ω 8Ω 15Ω 125Ω 250Ω 500Ω	205Ω CT	.4Ω .5Ω .8Ω 10Ω 14Ω 20Ω	T-25	A-3801	T22S68	A-3130	

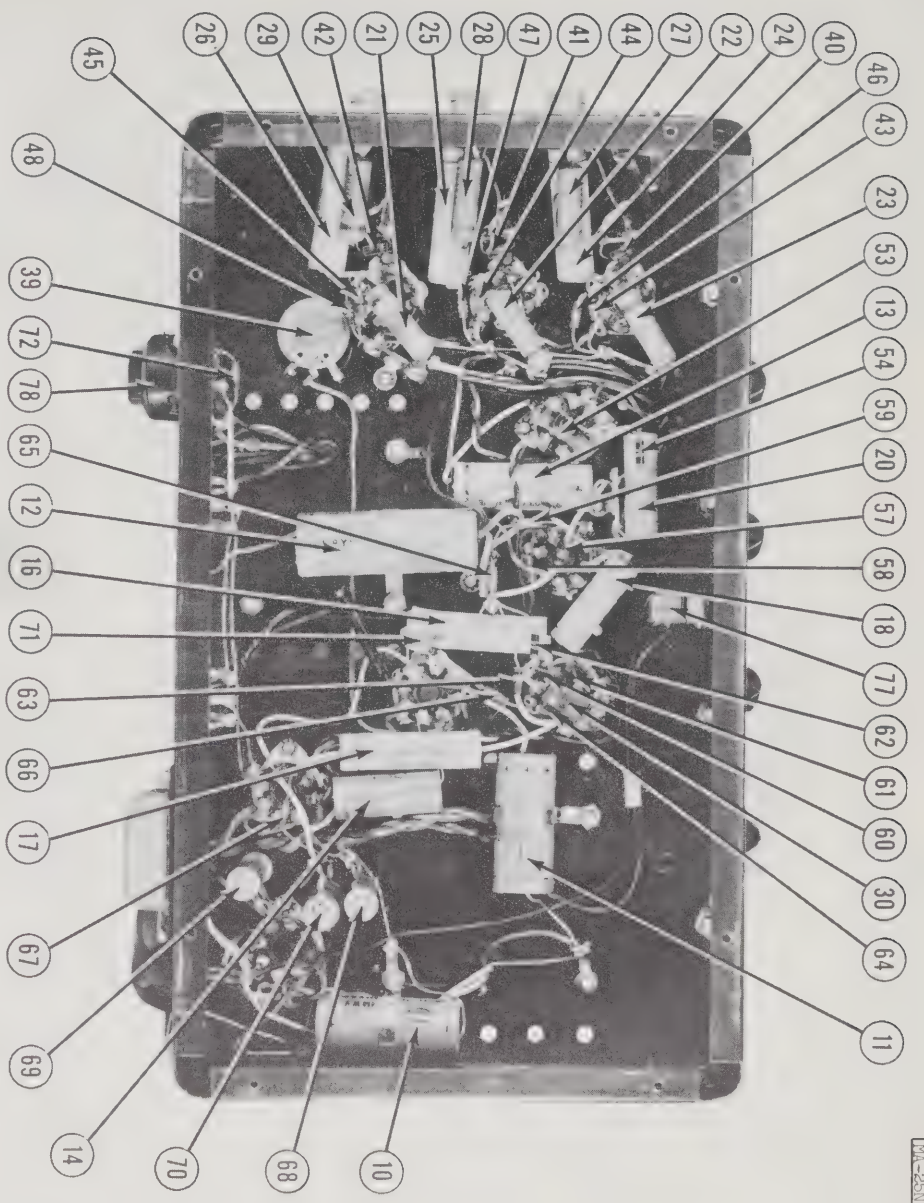
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MASCO PART No.		
75	Bayonet	6-8	0.25	Blue			Type 44
76	"	6-8	0.25	"			" "

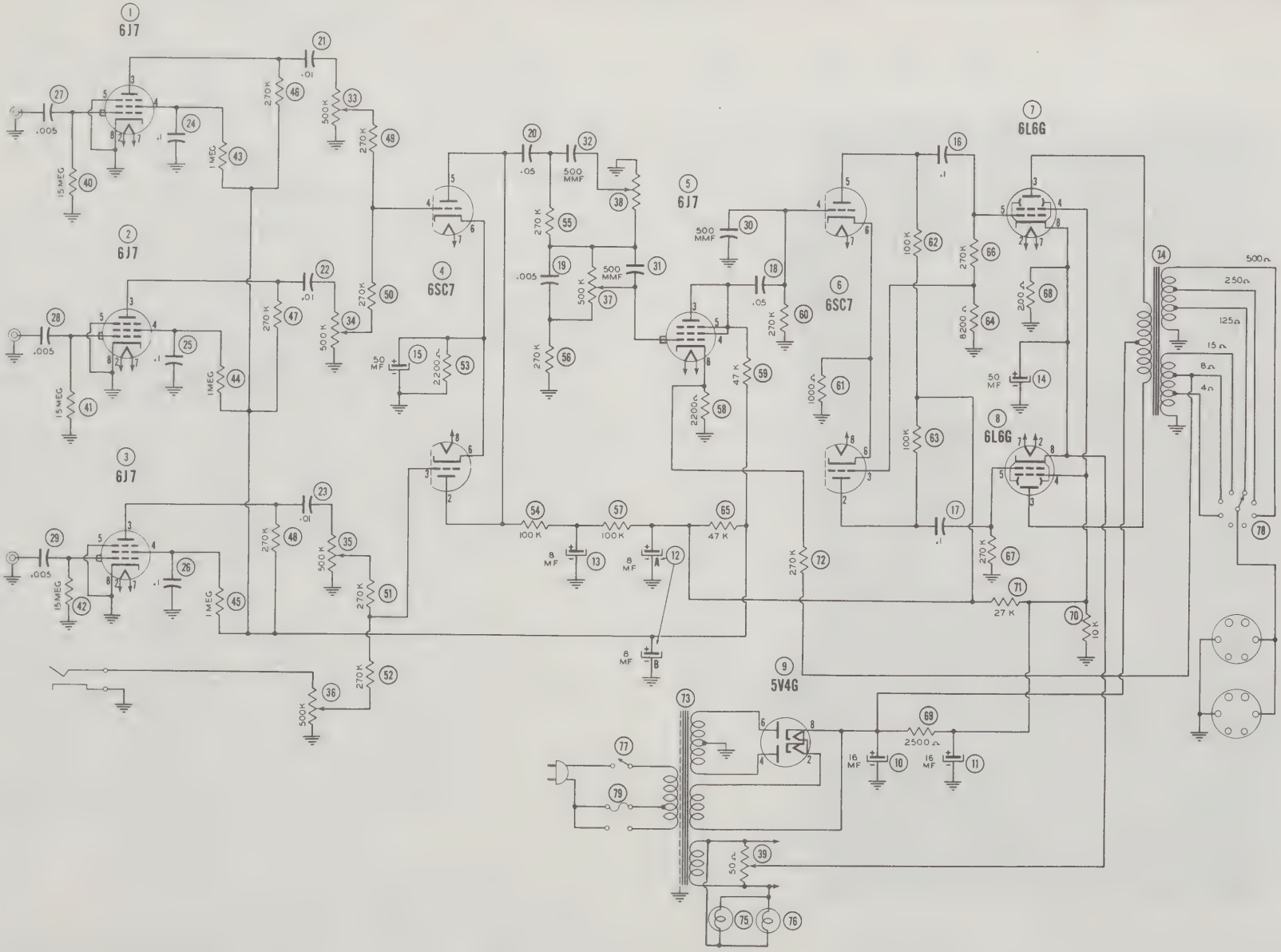
MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
77	Switch		On-Off
78	"		Impedance Selector
79	Fuse		1.5 Amp.

CHASSIS—BOTTOM VIEW



MASCO MODEL MA-25N



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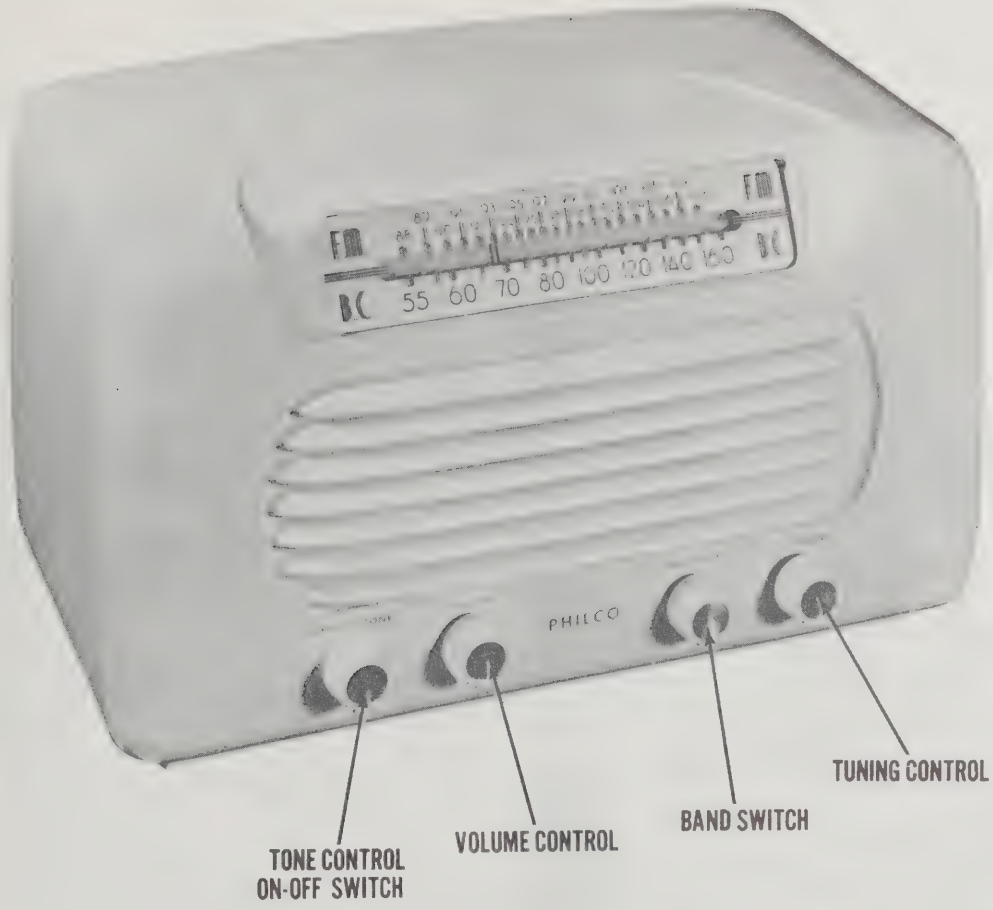
PHILCO MODELS
48-472, 48-472-I



PHILCO MODEL 48-472-I

TRADE NAME	Philco, Models 48-472, 48-472-I
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 12AW6 FM RF Amp., 14F8 Converter, 14H7 1st IF Amp., 14X7 Det.-AVC-AF, 50A5 Power Output, 117Z3 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
RATING	.36 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1720KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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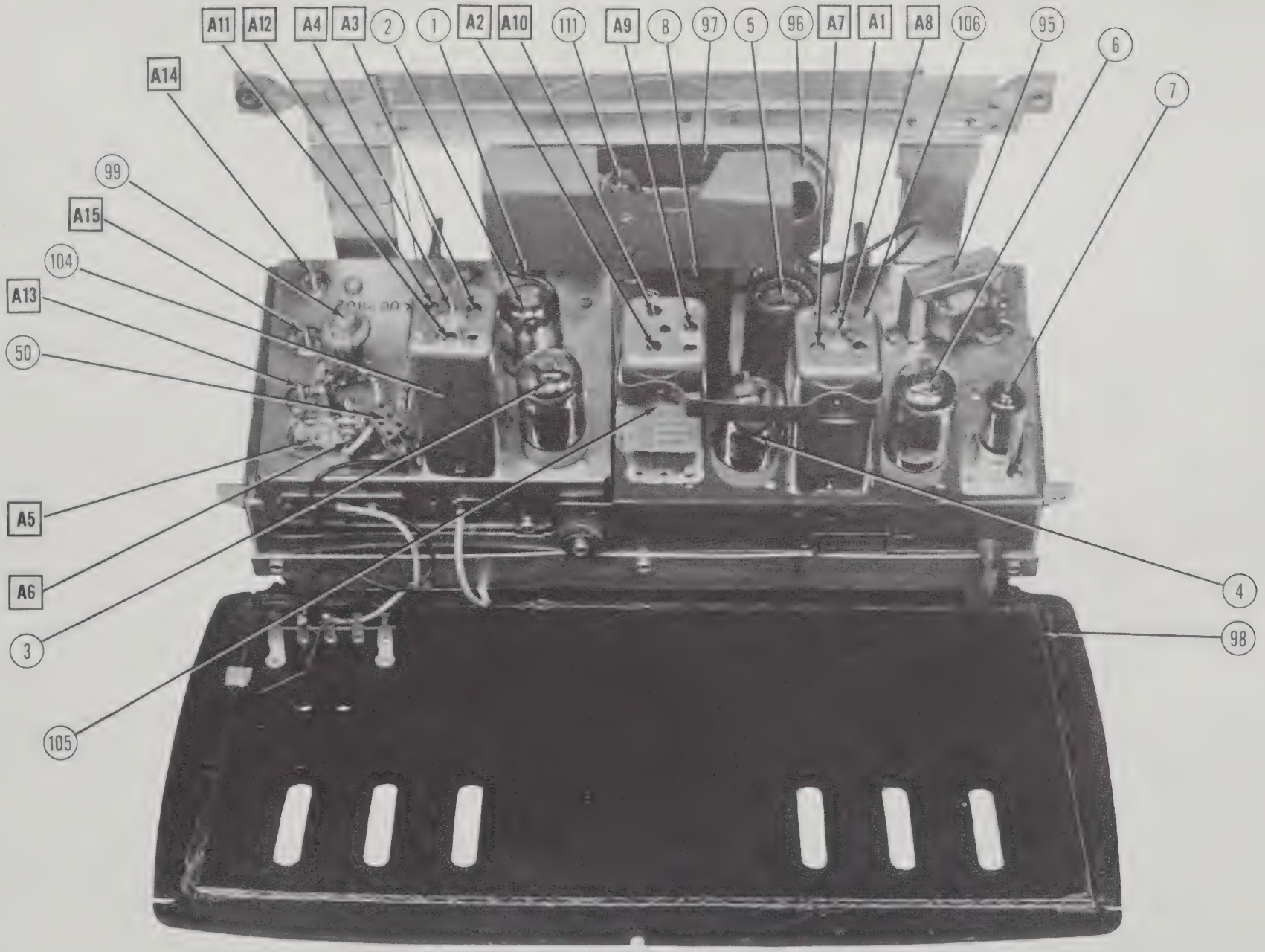
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	12AW6	12AW6	7CM	
2	Converter	14F8	14F8	8BW	
3	1st IF Amp.	14H7	14H7	8V	
4	2nd IF Amp.	14H7	14H7	8V	
5	Det.-AVC-AF	14X7	14X7		
6	Power Output	50A5	50A5	6AA	
7	Rectifier	11Z3	11Z3	4BR	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	150	30-2568-10	AF88D	UP84215	DY-804020-150	EL-340	◓ Filter
B	70	150						■ "
C	40	150		PRSA150-30-40			UT-301*	▲ "
9	25	25	30-2575-9	PRS25-25	BR252A	M-25-25	TA-25	Cathode Bypass
10	5	50	30-2417	PRS150-4	BR550	M-8-150	TA-55	Stabilizing Cap.
11	.04	400		484-04	DT4S4	MPH-4-05	TC-14	Line Filter
12	.04	400		484-04	DT4S4	MPH-4-05	TC-14	Rectifier Bypass
13	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
14	.002	600	61-0062	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
15	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	Tone Comp.
16	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	Line Filter
17	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
18	.05	400	38-5851-6	484-05	DT4S5	ST-4-05	72P2	Line Isolation-See Note
19	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	RF Filter
20	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	" "
21	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Tone Comp.
22	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
23	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	2nd IF Plate Decoup.
24	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	2nd IF Cathode Bypass
25	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
26	.002	600	61-0062	684-002	DT6D2	ST-6-002	TC-22	1st IF Screen Bypass
27	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
28	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
29	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
30	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Conv. Plate Decoup.
31	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Tuning Cap. Isolation
32	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Filament Bypass
33	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
34	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
35	8	500	30-1224-6					Ratio Det. Balancing-Cer
36	220	500	60-10255237	1468-00025	5W5T25	MO.5-325	1FM-325	RF Bypass-Cer.
37	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	RF Diode Filter-Cer.
38	220	500	62-122001001	1468-00025	5W5T25	MO.5-325	1FM-325	" " " "
39	220	500	62-122001001	1468-00025	5W5T25	MO.5-325	1FM-325	AVC Filter-Cer.
40	1500	300	30-1225-1	1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass Power Supp.-Cer.
41	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
42	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Feedback-Cer.
43	250	500	60-10255237	1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.-Cer.
44	51	500	30-1224	1468-00005	5W5Q5	MO.5-45	1FM-45	Feedback-Cer.
45	750	300		1468-00075	1W5T7	MO.3-37	1FM-37	Conv. Cathode-Cer.
46	150	500	60-10155407	1468-00015	5W5T15	MO.5-315	1FM-315	RF Bypass-Cer.
47	51	500	30-1224	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
48	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
49	33	500	30-1212	1468-00004	5W5Q3	MO.5-43	MS-43	" " "
50	10	500		1468-00001	5W5Q1	MO.5-41	MS-41	Ant. Coupling
51	51	500	30-1224	1468-00005	5W5Q5	MO.5-45	1FM-45	FM Ant. Coupling-Cer.
52	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	FM RF Screen Bypass-Cer
53	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
54	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
55	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	Filament Bypass-Cer.
56	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
57	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	" " "

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
58	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
59	10	500		1468-00001	5W5Q1	MO.5-41	MS-41	FM Ant. Coupling-Cer.
114	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
115	100	500	30-1225-2	1468-0001	5W5T1	MO.5-31	1FM-31	AVC Filter

*Parallel sections to obtain desired capacity.
Note-Wind same number turns on replacement as on original.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
60	2 Meg.	½	33-5530-19		M-83-S	Volume Control
61	500KΩ	½	33-5538-11			Tone Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
62	10Ω	½	66-0103340		Br.-Blk.-Blk. Parasitic Suppressor
63	10Ω	½	66-0103340		Br.-Blk.-Blk. " "
64	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. FM-RF Grid
65	47Ω	½	66-0473340		Yl.-Vi.-Blk. FM-RF Cathode
66	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red FM-RF Screen Dropping
67	68Ω	½	66-0683340		Blue-Gray-Blk. Decoupling
68	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Converter Grid
69	1500Ω	½	66-2153340	BTS-1500	Br.-Grn.-Red Converter Cathode
70	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Oscillator Grid
71	8200Ω	½	66-2823340	BTS-8200	Gray-Red-Red Oscillator Plate Load
72	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
73	22Ω	½	66-0223340		Red-Red-Blk. Parasitic Suppressor
74	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Decoupling
75	68Ω	½	66-0683340		Blue-Gray-Blk. "
76	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. 1st IF Grid
77	68Ω	½	66-0683340		Blue-Gray-Blk. 1st IF Cathode
78	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
79	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
80	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
81	120Ω	½	66-1123340		Br.-Red-Br. 2nd IF Cathode
82	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Screen Dropping
83	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
84	3.3 Meg.	½	66-5333340	BTS-3.3 Meg	Or.-Or.-Grn. AVC Network
85	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Diode Load
86	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Diode RF Filter
87	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Ratio Det. Diode Load
88	68Ω	½	66-0683340		Blue-Gray-Blk Decoupling
89	8.2 Meg.	½	66-5823340	BTS-8.2 Meg	Gray-Red-Grn. AF Grid
90	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
91	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
92	120Ω	½	66-1123340	BW-½-120	Br.-Red-Br. Output Cathode
93	470Ω	1	66-1474340	BTA-470	Yl.-Vi.-Br. Filter
94	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. "
116	1500Ω	½	66-2153340	BTS-1500	Br.-Grn.-Red Parasitic Suppressor

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
95	1850Ω	3.4Ω	230Ω	.7Ω	32-8296-4	A-3876	T22845	A-2028	

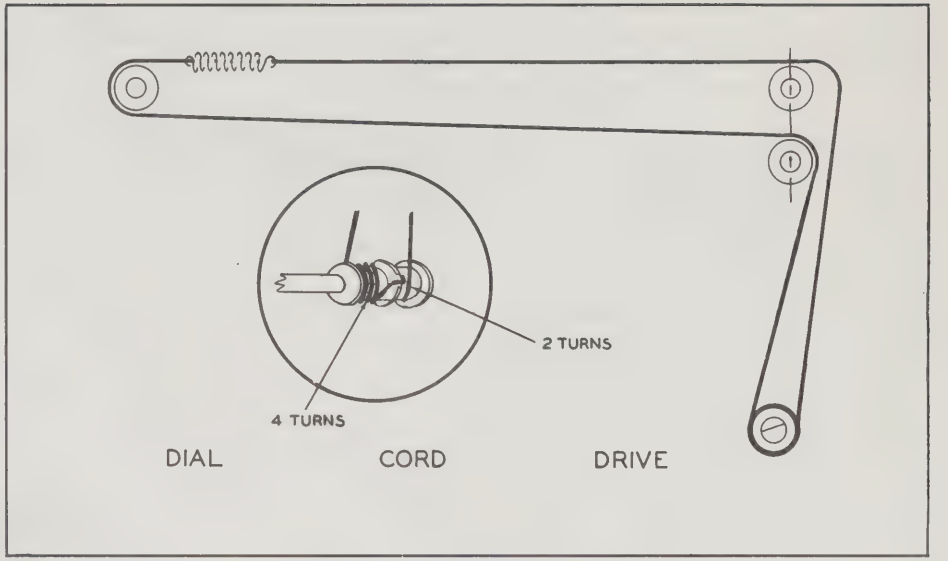
PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
96	PM	3.4Ω	36-1604-1		46A1†	†Fabricate new mounting bracket.
	CONE DIA.	VC DIA.				
97	4"x6"	1/2"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	MEISSNER PART No.	
98	Loop Ant.		1.3Ω	32-4052-16		
99	Loop Load. Coil		1Ω	32-4217		
100	FM Ant.Coil		0Ω	32-4158		
101	FM RF Coil		0Ω	32-4159		
102	BC Osc.Coil		2.8Ω	32-4019-5		
103	FM Osc. "		0Ω	32-4184		
104A	AM 1st IF	1Ω	20Ω	32-4146-1		
B	FM " "	1Ω	1Ω			
105A	AM 2nd IF	6Ω‡	11Ω#	32-4156		‡Includes both pri.
B	FM " "					# " " sec.
106A	AM 3rd IF	10Ω‡	20Ω§	32-4079		§Measured from Pin 5 of 14X7 to low side of AM secondary.
B	FM Disc.		1Ω			
107	RF Choke		0Ω	32-4111		
108	" "		.1Ω	32-4061		
109	Conv. Cath. Choke		.1Ω	32-4157-1		
110	RF Fil. Choke		1Ω	32-4143-4		



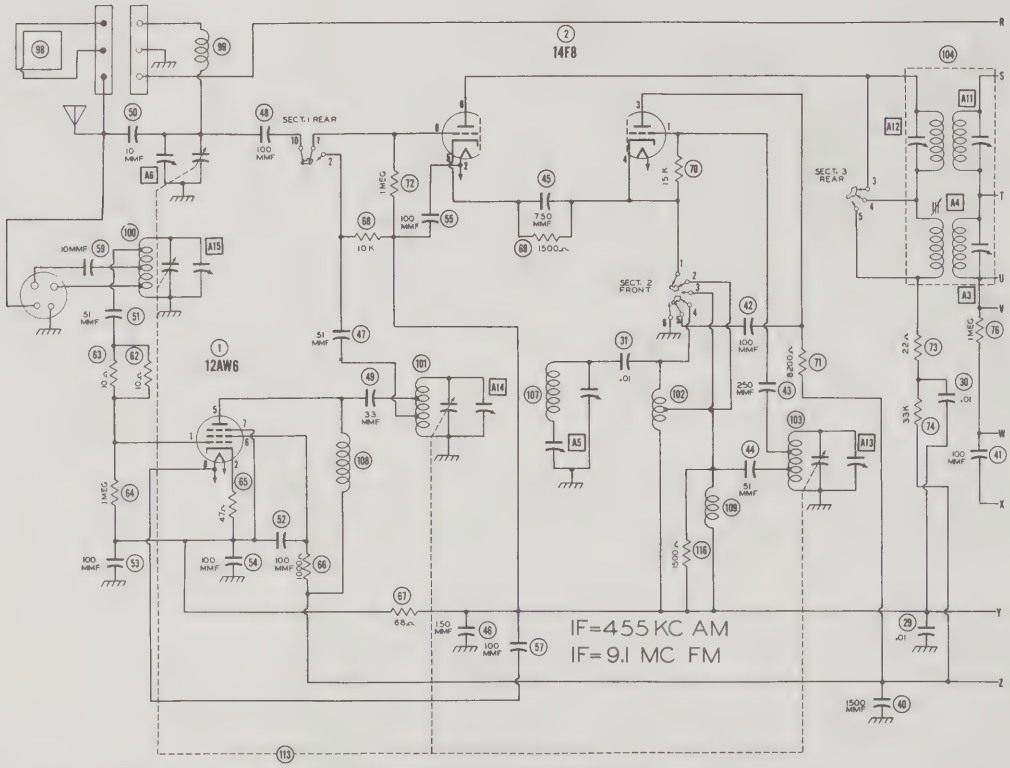
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.		INSTALLATION NOTES
111	Screw	120			34-2477		Type C-7

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
112	Switch	42-1300	Band
113	Tuning Gang	31-2703	AM (21-533MMF, 15-250MMF)
A5	Trimmer Strip	31-6308-1	BC Osc. Adj.
A6			BC Ant. Adj.
	Dial Scale	27-5954	Model 48-472
	" "	27-5954-1	Model 48-472-I
	Dial Pointer	50-4535FCP	
	Knob	54-4376	Model 48-472
	"	54-4375	" 48-472-I

DATE 8/48-#4913-15 SET #43-FOLDER #15



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	[illegible]	[illegible]	[illegible]	[illegible]	1.3V.	[illegible]	95VDC	0V.	-
2	[illegible]	[illegible]	13VAC	[illegible]	[illegible]	[illegible]	[illegible]	0V.	0V.
3	14H7	[illegible]	100VDC	[illegible]	[illegible]	1.2VAC	1.2V.	1.3V.	40VAC
4	14H7	[illegible]	97VDC	[illegible]	[illegible]	[illegible]	1.1V.	[illegible]	52VAC
5‡	14X7	[illegible]	86VDC	[illegible]	[illegible]	[illegible]	-2.2VDC	[illegible]	13VAC
5‡	14X7	0V.	88VDC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13VAC
6	[illegible]	117VAC	85VDC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	65VAC
7	117Z3	117VAC	[illegible]	0V.	117VAC	117VAC	[illegible]	[illegible]	-

‡TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	[illegible]	[illegible]	47Ω	25Ω	3Ω	[illegible]	68KΩ	[illegible]	-
2	[illegible]	12KΩ	1MΩ	50KΩ	13KΩ	[illegible]	68KΩ	12KΩ	1 MΩ
3	14H7	40Ω	0Ω	200Ω	60Ω	[illegible]	[illegible]	1.5KΩ	[illegible]
4	14H7	40Ω	[illegible]	200Ω	70Ω	[illegible]	1.2KΩ	120Ω	[illegible]
5‡	14X7	[illegible]	[illegible]	10 Meg.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5‡	14X7	[illegible]	[illegible]	10 Meg.	[illegible]	[illegible]	47KΩ	2.1 Meg.	[illegible]
6	[illegible]	[illegible]	[illegible]	60KΩ	[illegible]	[illegible]	47KΩ	1.0Ω	[illegible]
7	117Z3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	INF.	[illegible]

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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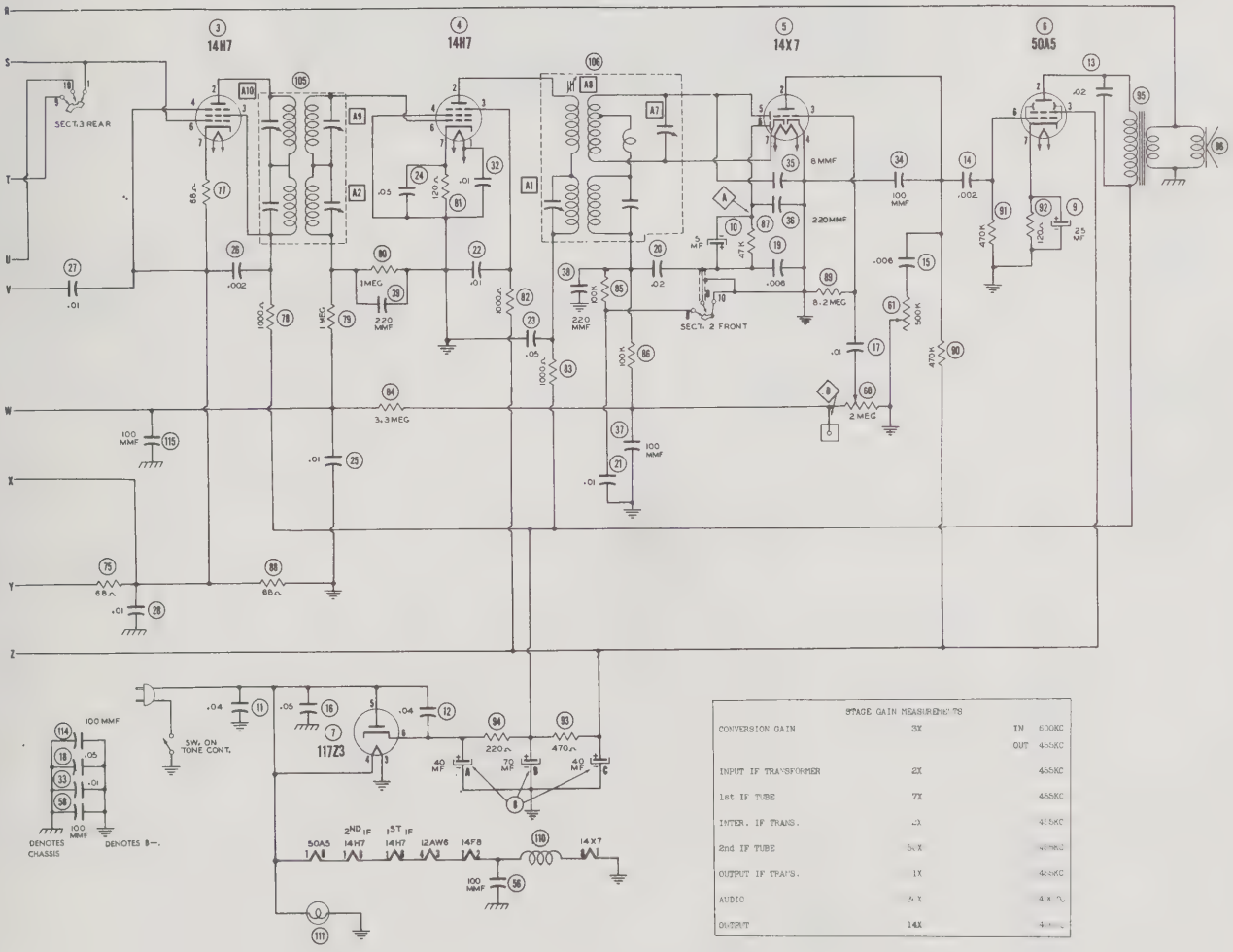

STAGE GAIN MEASUREMENTS			
CONVERSION GAIN	3X	IN	600KC
		OUT	455KC
INPUT IF TRANSFORMER	2X		455KC
1st IF TUBE	7X		455KC
INTER. IF TRANS.	3X		455KC
2nd IF TUBE	5X		455KC
OUTPUT IF TRANS.	1X		455KC
AUDIO	5X		455KC
OUTPUT	14X		455KC

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

AM Alignment should be done before FM alignment.
With receiver in cabinet turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial This is the calibration mark referred to below.

AM ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to terminal 1 of antenna terminal strip. Low side to B-.	455KC	BC (Counter-clock-wise)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4	Adjust for maximum output in order given. Do not repeat.
2		Loop	1600KC	"	5-15/16" from cali-bration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of re-ceiver. Adjust for maxi-mum output.
3		"	1500KC	"	Tune for max-imum output.	"	A6	Adjust for maximum output

FM IF ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.1 MFD.	High side to Pin 1 (grid) of 12AW6. Low side to B-.	9.1MC (400 ∿ Amp. Mod.)	FM (Clock-wise)	Tuning cap. fully closed	DC probe to Point (A). Low Side to B-.	A7,A8, A9,A10	Adjust for maximum de-flection in order given. Repeat adjustments until no further improvement can be made. Attenuate output of sig. gen. to maintain maximum meter reading of 10 volts. Once this step is com-pleted do not touch any of the trimmers with ex-ception of A7.
5	.1 MFD.	High side to Pin 8 (grid) of 14F8. Low side to B-.	"	"	"	"	A11, A12	Adjust for maximum de-flection. Attenuate out-put of signal generator to maintain maximum meter reading of 10 volts. After completion of this step do not touch either of the adjustments.
6	.1 MFD.	"	"	"	"	"	A7	Connect output meter ac-ross voice coil and very carefully adjust A7 for minimum output. This ad-justment is critical as misalignment will result in distortion. Continue with FM RF Alignment, Step 7.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	.1 MFD.	High side to Pin 1 (grid) of 12AW6. Low side to B-.	9.1MC (Freq. Mod)	FM	Tuning cap. fully closed	Vertical input to Point (A). Ground to B-.	A8,A9, A10, A11, A12.	Disconnect 5 MFD cap. (10) from Point (A). Ad-just for maximum ampli-tude, symmetry and coin-cidence of pattern per Fig. 1.
5	.1 MFD.	"	"	"	"	Vertical input to Point (A). Ground to B-.	A7	Reconnect 5 MFD cap. (10) to Point (A). Adjust A7 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 7.

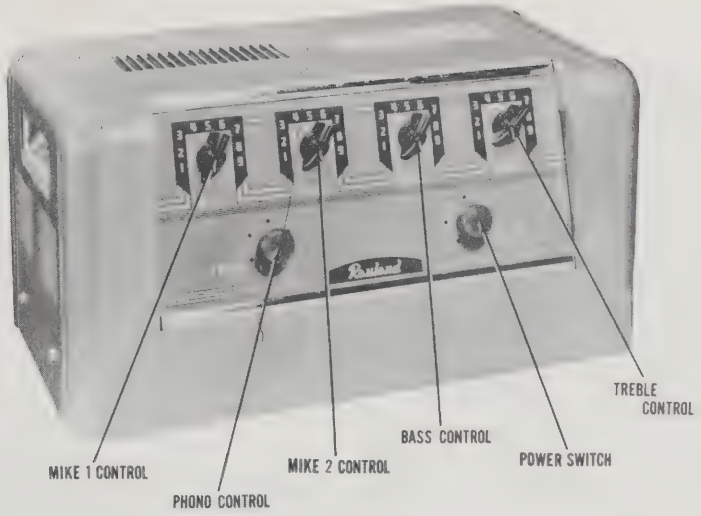
FM RF ALIGNMENT

Adjust of FM antenna, RF and oscillator coils (100, 101 & 103) should be done with a tuning wand. If deflection increases when iron end of wand is inserted in the coil, compress the turns slightly. If deflection increases when brass end of wand is inserted spread the turns slightly. Correct adjustment is indicated when deflection decreases upon insertion of either end of the wand.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	300Ω carbon res.	High side to Pin 3 of FM antenna socket. Low side to chassis.	105MC (400 ∿ Amp. modu-lation)	FM	5-3/4" from calibration mark.	DC probe to Point (A). Common to B-.	A13	Adjust for maximum de-flection.
8	"	"	"	"	Tune for max-imum deflec-tion.	"	A14,A15	Rock tuning cap. and ad-just for maximum deflec-tion.
9	"	"	92MC	"	1-11/16" from calibra-tion	"	FM Osc. Coil (103)	Adjust per prealignment notes.
10	"	"	"	"	Tune for max-imum deflec-tion.	"	FM-RF Coil (101)	Rock tuning cap. and ad-just per prealignment notes.
11	"	"	"	"	Tune for max-imum deflec-tion.	"	FM Ant. Coil (100)	Adjust per prealignment notes. Repeat Steps 7, 8, 9, 10 & 11 until no further improvement can be made.

FIG. 1

FIG. 2



RAULAND MODEL W-819-A

TRADE NAME	Rauland, Model W-819-A
MANUFACTURER	The Rauland Corp., 4245 Knox Ave., Chicago 4, Ill.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (EIGHT)	Types, 6SJ7 1st Mic. Amp., 6SJ7 2nd Mic. Amp., 6SC7 Phono Amp., 6SC7 AF Amp., 6SN7GT AF-Phase Inv., (2) 6L6G Power Output, 5U4G Rectifier
POWER SUPPLY	117-130 Volts AC RATING .86 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	18VDC	0V.	-.7VDC	0V.	16VDC	18VDC	113VDC
2	6SJ7	0V.	18VDC	0V.	-.8VDC	0V.	18VDC	18VDC	114VDC
3	6SC7	0V.	97VDC	0V.	0V.	97VDC	1VDC	18VDC	18VDC
4	6SC7	0V.	0V.	0V.	0V.	97VDC	1VDC	18VDC	18VDC
5	6SN7GT	0V.	108VDC	3.7VDC	0V.	109 VDC	3.7VDC	18VDC	18VDC
6	6L6G	0V.	18VDC	350VDC	250VDC	0V.	108VDC	18VDC	18VDC
7	6L6G	0V.	18VDC	350VDC	250VDC	0V.	0V.	18VDC	18VDC
8	5U4G	0V.	355VDC	0V.	310VAC	0V.	310VAC	0V.	355VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	200Ω	0Ω	2.6 Meg.	0Ω	15KΩ	200Ω	300KΩ
2	6SJ7	0Ω	200Ω	0Ω	2.6 Meg.	0Ω	15KΩ	200Ω	300KΩ
3	6SC7	0Ω	100KΩ	0Ω	0Ω	100KΩ	1000Ω	200Ω	200Ω
4	6SC7	0Ω	0Ω	0Ω	0Ω	100KΩ	1000Ω	200Ω	200Ω
5	6SN7GT	7000Ω	120KΩ	1000Ω	100KΩ	120KΩ	1000Ω	200Ω	200Ω
6	6L6G	0Ω	200Ω	60KΩ	60KΩ	100KΩ	120KΩ	200Ω	200Ω
7	6L6G	0Ω	200Ω	60KΩ	60KΩ	100KΩ	INF.	200Ω	200Ω
8	5U4G	INF.	60KΩ	INF.	65Ω	INF.	70Ω	INF.	60KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

RAULAND MODEL W-81-A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		RAULAND PART No.	STANDARD REPLACEMENT		
1	1st Mic. Amp.	6SJ7	6SJ7	8N	
2	2nd Mic. Amp.	6SJ7	6SJ7	8N	
3	Phono Amp.	6SC7	6SC7	8S	
4	AF Amp.	6SC7	6SC7	8S	
5	AF & Phase Inv.	6SN7GT	6SN7GT	9BD	
6	Power Output	6L6G	6L6G	7AC	
7	" "	6L6G	6L6G	7AC	
8	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	RAULAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
9A	40	450		AF4444J*	UP43145#	DY-4x20-450*	EL-420*	▲ Filter
B	20	450						■▲ "
C	10	450						■ "
10	16	350		PRS350/16	BR1635	M-20-350	UT-163	"
11A	40	25		PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Cathode Bypass
B	40	25						" "
12	40	25		PRS150/40	BR502	M-50-25	TA-50	" "
13	.1	600		684-1	DT6P1	ST-6-1	TC-1	Audio Coupling
14	.1	600		684-1	DT6P1	ST-6-1	TC-1	" "
15	.01	600		684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
16	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
17	.1	600		684-1	DT6P1	ST-6-1	TC-1	Audio Coupling
18	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
19	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
20	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Tone Comp.

*Parallel sections to obtain desired capacity.
#Omit bypass section.

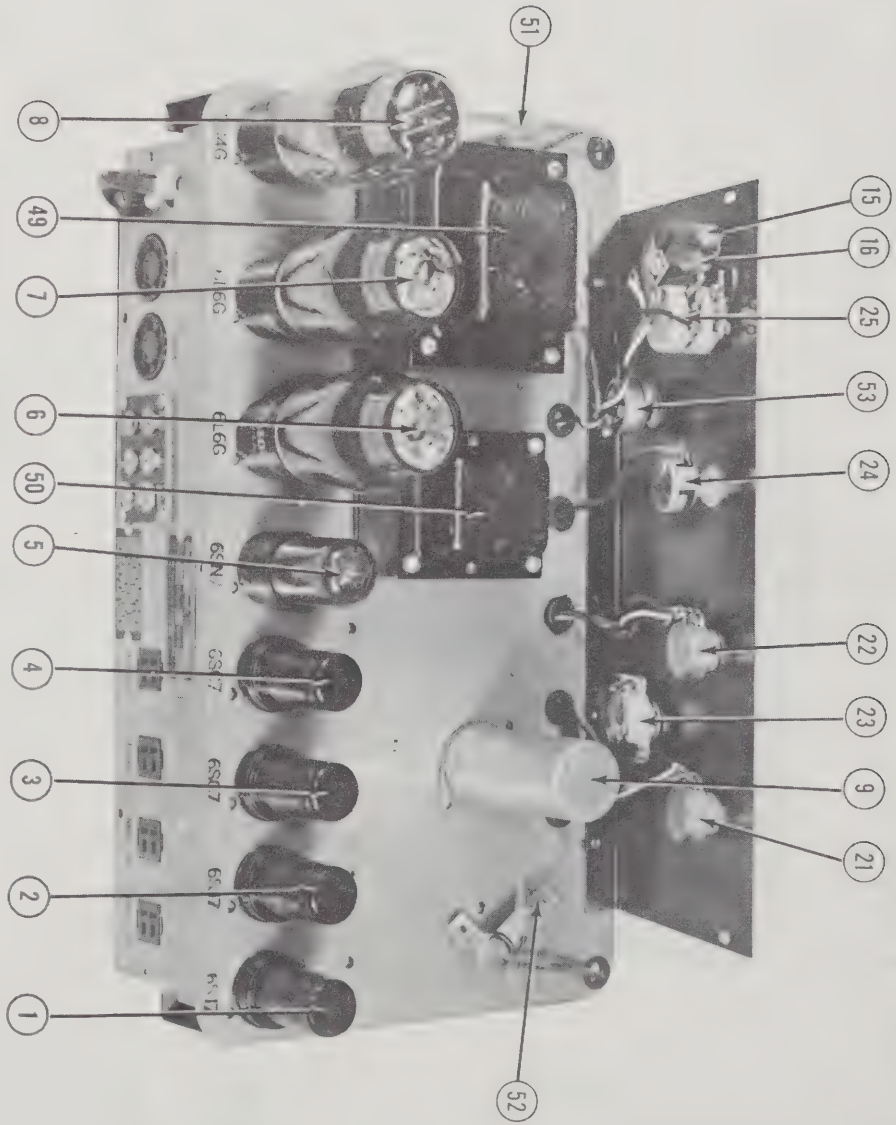
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	
21A	500KΩ	½	RP-504B	D13-133	M-60-Z	Mike 1 Control
B	Shaft		Not Req.	A	Not Req.	Attach to 21A per instructions
22A	500KΩ	½	RP-504B	D13-133	M-60-Z	Mike 2 Control
B	Shaft		Not Req.	A	Not Req.	Attach to 22A per instructions
23A	1 Meg.	½	RP-105A	DVC-539X		Phono Control
B	Shaft		Not Req.	A		Attach to 23A per instructions
24	2 Meg.	½	RP-205B		M-83-S	Bass Control
25A	500KΩ	½ }	RP-204E	DC-10-Z	33-3333	Treble Control } Dual
B	500KΩ	½ }				" " }

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	
26	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Grid
27	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Grid
28	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st Mic. Amp. Screen Dropping
29	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd Mic. Amp. Screen Dropping
30	250KΩ	½		BTS-270K	Red-Grn.-Yl. 1st Mic. Amp. Plate Load
31	250KΩ	½		BTS-270K	Red-Grn.-Yl. 2nd Mic. Amp. Plate Load
32	15KΩ	½		BTS-15K	Br.-Grn.-Or. Bleeder

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	
33	15KΩ	½		BTS-15K	Br.-Grn.-Or. "
34	1000Ω	½		BTS-1000	Br.-Blk.-Red Phono Amp. Cathode
35	75Ω	½		BW-½-68	Vi.-Grn.-Blk. " " "
36	68KΩ	½		BTS-68K	Blue-Blk.-Or. AF & Phono Amp. Plate Load
37	15KΩ	½		BTS-15K	Br.-Grn.-Or. Decoupling
38	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Grid
39	1000Ω	½		BTS-1000	Br.-Blk.-Red AF Cathode
40	68KΩ	½		BTS-68K	Blue-Blk.-Or. AF Plate Load
41	68KΩ	½		BTS-68K	Blue-Blk.-Or. Phase Inverter Plate Load
42	7000Ω	½		BTS-6800	Vi.-Blk.-Red Phase Inverter Grid
43	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
44	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
45	200Ω	10		AB-200	Output Cathode
46	33KΩ	½		BTS-33K	Or.-Or.-Or. Feedback
47	5000Ω	2		BTS-4700	Grn.-Blk.-Red Filter
48	6800Ω	2		BT-2-6800	Blue-Gray-Red "

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAULAND PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
49	117V AC @ .86A	620V CT .102A DC	4.6V AC @ 3.0A	6.0V AC @ 3.8A				

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RAULAND PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
50	8400Ω CT	4Ω 8Ω 250Ω 500Ω	200Ω CT	.3Ω .7Ω 77Ω 116Ω	LO-0093	A-3885‡	T22S66‡	A-3128‡	‡Drill new mounting holes.

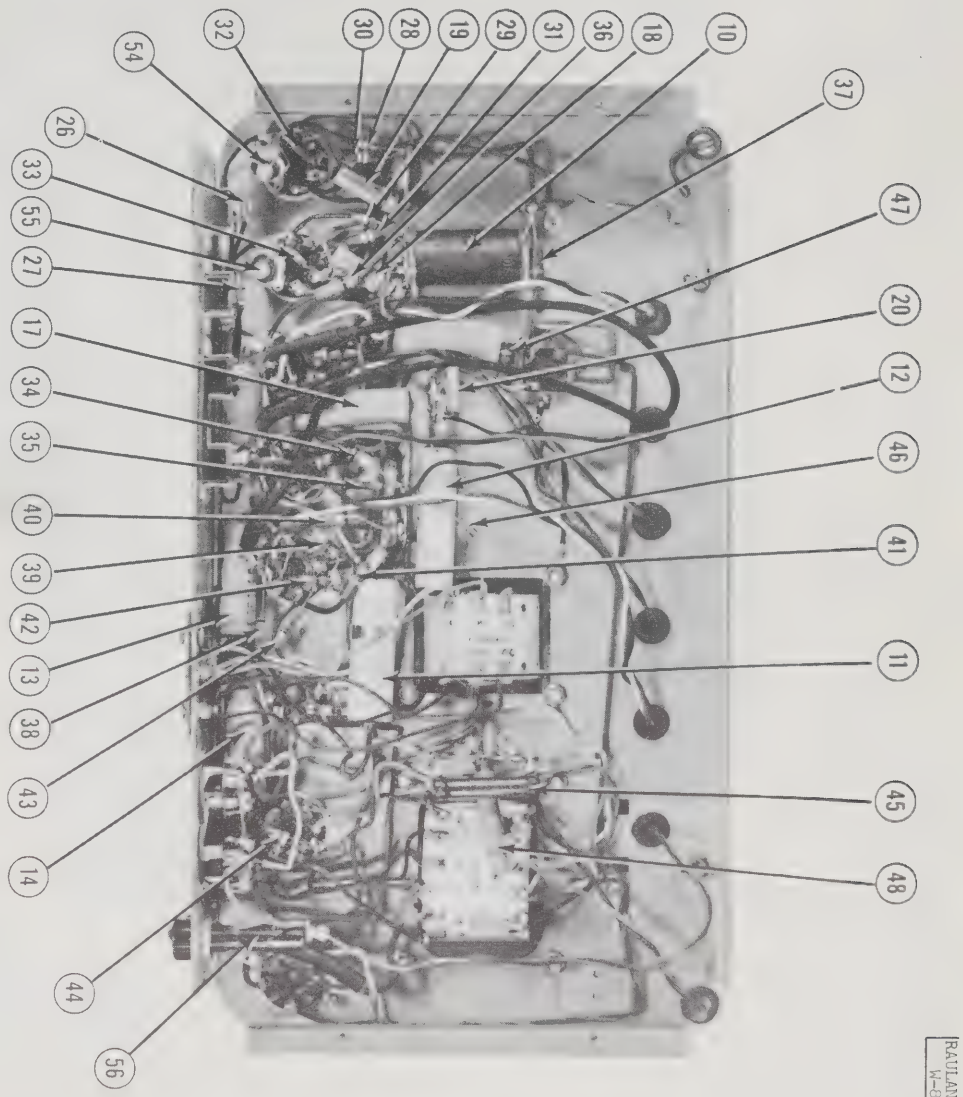
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					RAULAND PART No.		
51	Bayonet	6-8	0.25	Blue			Type 44
52	"	6-8	0.25	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
53	Switch		On-Off
54	Bias Cell		
55	" "		
56	Fuse		3 Amp.

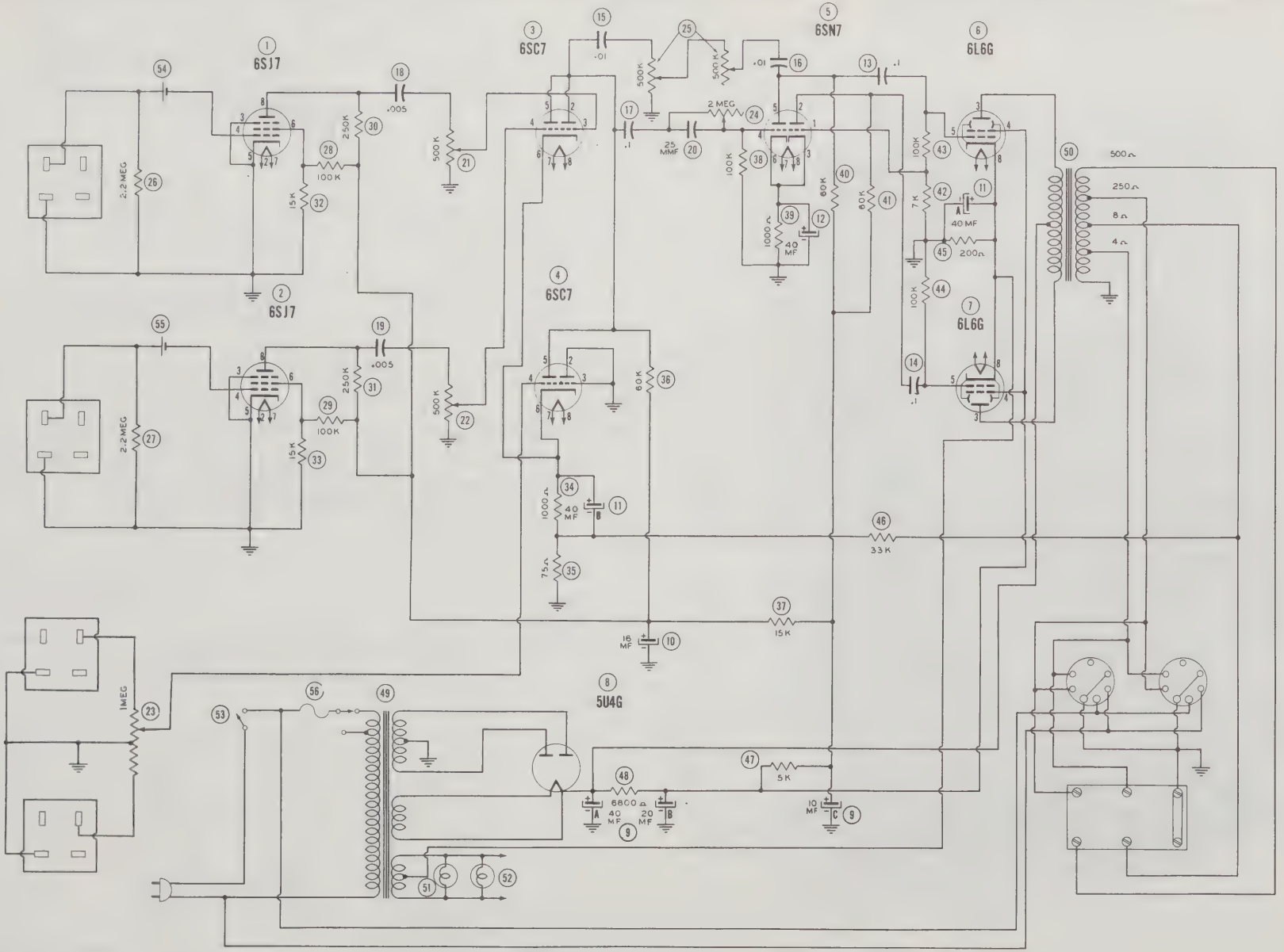
CHASSIS—BOTTOM VIEW



RAULAND MODEL W-819-A

DATE 8/48-#4813-16 SET #43-FOLDER #16

RAULAND MODEL W-819-A



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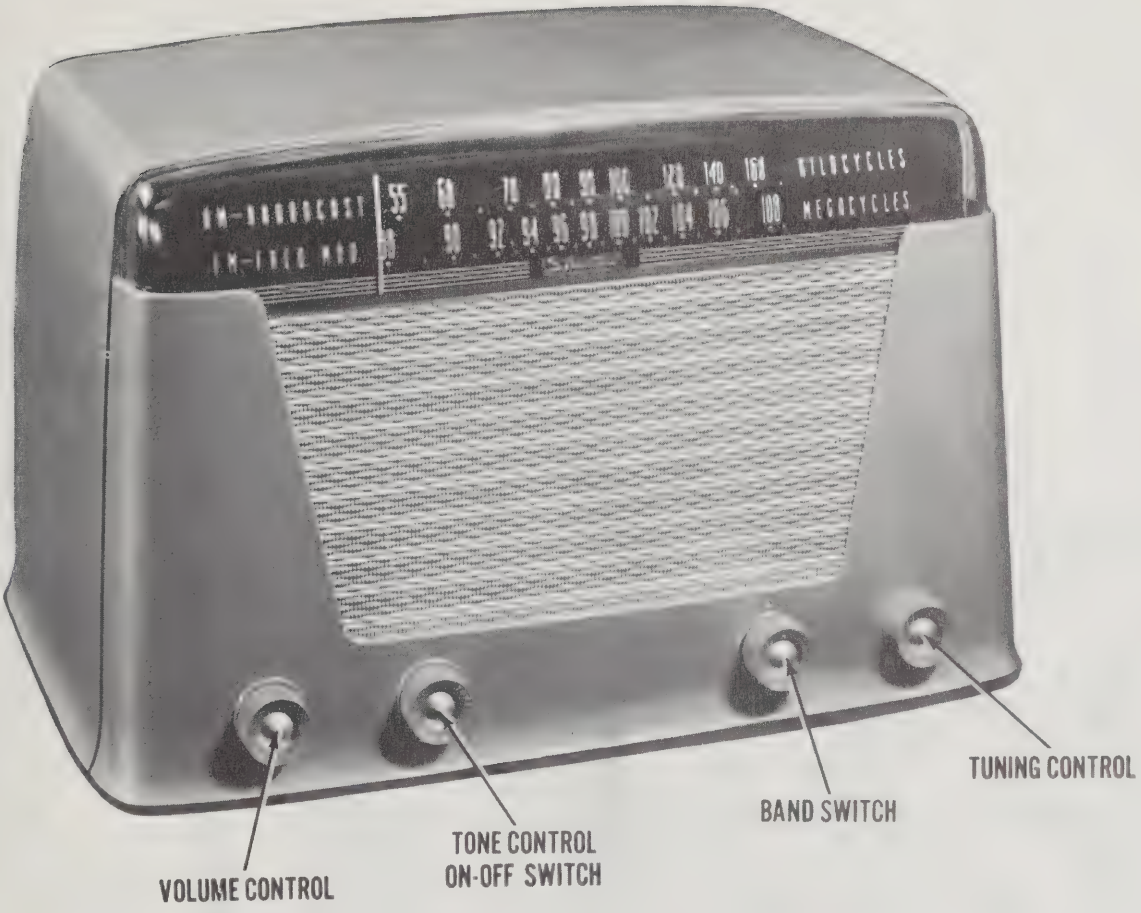
4813-16

SILVERTONE MODELS
8020 (Ch. 132.841)



SILVERTONE MODELS
8020 (Ch. 132.841)

SILVERTONE MODEL 8020

TRADE NAME	Silvertone, Model 8020 (Ch. 132.841)
MANUFACTURER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6C4 FM RF Amp., 12BA6 FM RF Amp., 12BE6 Converter, 12BA6 IF Amp., 12BA6 FM 2nd IF Amp., 12H6 FM Ratio Det., 6AQ6 AM Det.-AVC-AF, 50L6GT Power Output.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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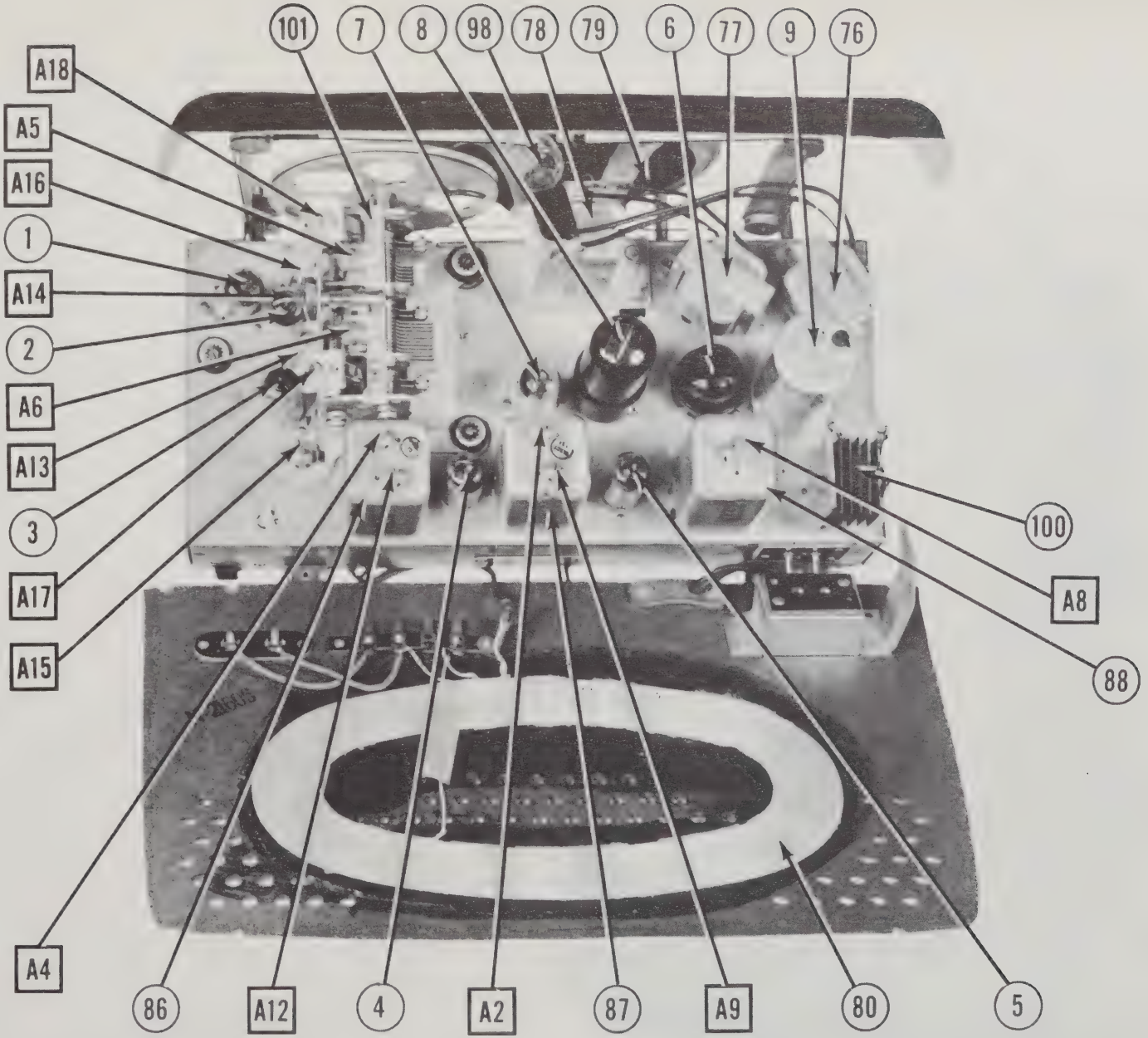
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT		
1	FM RF Amp.	6C4	6C4	6BG	
2	FM RF Amp.	12BA6	12BA6	7BK	
3	Converter	12BE6	12BE6	7BH	
4	IF Amp.	12BA6	12BA6	7BK	
5	FM 2nd IF Amp.	12BA6	12BA6	7BK	
6	FM Ratio Det.	12AV6	12AV6	7AQ	
7	AM Det.-AVC-AF	6AL5	6AL5	7AT	
8	Power Output	6V6GT	6V6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
9A	40	150	N21402	AF886D4A*	UP44315C*	DY-419*	EL-443*	▲ Filter
B	80	150		PRS150/50	BR5C15	M-40-150	UT-501	▲ "
C	40	150						■ "
D	20	25						Cathode Bypass
10	8	50	N21403	PRS50/10	BR105	M-10-50	TA-510	Stabilizing Cap.
11	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
12	.006	600		684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
13	.005	600		684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
14	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
15	.005	600		684-005	DT6D5	ST-6-005	TC-25	De-emphasis
16	.05	400		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
17	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Output Grid Bypass
18	2000	350		1467-002	1W5D2	MW.5-32	1FM-32	Tone Comp.-Cer.
19	50	500		1468-00005	5W5T5	MO.5-45	1FM-45	Diode Load Cap.-Cer.
20	50	500		1468-00005	5W5T5	MO.5-45	1FM-45	" " " "
21	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Decoupling-Cer.
22	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Bypass-Cer.
23	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter - "
24	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " " - "
25	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	1st IF Decoupling - "
26	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	AVC Filter - "
27	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	Conv. Decoupling - "
28	1000	350		1468-001	1W5D1	MO.3-21	1FM-21	Conv. Screen Bypass - "
29	20	500			5W5Q2	MOS.5-42	MS-42	Conv. Plate Bypass - "
30	27	500		1468-000025	5W5Z5	MO.5-425	MS-425	Osc. Grid Cap. - "
31	100	500		1469-0001	5R5T1	MOS.5-31	MS-31	Fixed Pad - "
32	200	500		1469-0002	5R5T2	MOS.5-32	MS-32	" "
33	10	500		1468-00001	5W5Q1	MO.5-41	MS-41	RF Coupling - "
34	5000	350		1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass Power Supply-"
35	100	350		1467-001	1D5D1	MO.3-21	1FM-21	RF Decoupling "
36	50	500		1468-00005	5W5Z5	MO.5-45	1FM-45	RF Cathode Bypass "
37	50	500		1468-00005	5W5Z5	MO.5-45	1FM-45	RF Coupling -Cer.
38	500	350		1468-0005	5W5T5	MO.5-35	1FM-35	Cathode Follower Decoup."
39	1000	350		1467-001	1W5D1	MO.3-21	1FM-21	AVC Filter "
40	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass "
41	1000	350		1468-001	1W5D1	MO.3-21	1FM-21	RF Bypass-See Note "
42	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling "
43	50	500		1468-00005	5W5Z5	MO.5-45	1FM-45	Filament Bypass "
44	50	500		1468-00005	5W5Z5	MO.5-45	1FM-45	" " "
45	1000	350		1468-001	1W5D1	MO.3-21	1FM-21	" " "
46	50	500		1468-00005	5W5Z5	MO.5-45	1FM-45	" " -See Note "
47	10	500		1468-00001	5W5Q1	MO.5-41	MS-41	FM Ant. Coupling "
48	10	500		1468-00001	5W5Q1	MO.5-41	MS-41	" " " "
102	1000	350		1468-001	1W5D1	MW.5-21	1FM-21	RF Bypass Pwr. Supply-See Note "

*-Parallel sections to obtain desired capacity.
Note-Not used in all models.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-107		
78	PM	3.3Ω	N21658	Mod. P5-V	52A1	
	CONE DIA.	VC DIA.				
78	5-1/8"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	
80	Loop Ant.		1Ω	N21605-1		
81	FM Ant.Coil	.5Ω	.5Ω	N21398-1		
82	FM 1st RF "		0Ω	N21399-1		
83	FM 2nd " "		0Ω	N21400-1		
84	BC Osc. "	.7Ω	6Ω	N21396-1	14-1060	
85	FM " "		0Ω	N21397-1		
86A	AM 1st IF	14.5Ω	14.5Ω	N21390-2		
B	FM " "	.8Ω	.8Ω			
87A	AM 2nd IF	17.2Ω	17.2Ω	N21391-2		
B	FM " "	1Ω	1Ω			
88	FM Det. Trans.	1Ω	1Ω	N21392-2		
89	RF Choke		1.5Ω	N21445-1		
90	" "		1.5Ω	N21445-1		
91	" "		1.5Ω	N21445-1		
92	" "		1.5Ω	N21445-1		
93	" "		1.5Ω	N21445-1		
94	" "		1.5Ω	N21445-1		
95	Line Filter Choke		.2Ω	N21444-1		
96	"		.2Ω	N21444-1		
97	Suppressor Choke		0Ω	N21700-1		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SILVERTONE PART No.		
98	Screw	120					Type C7

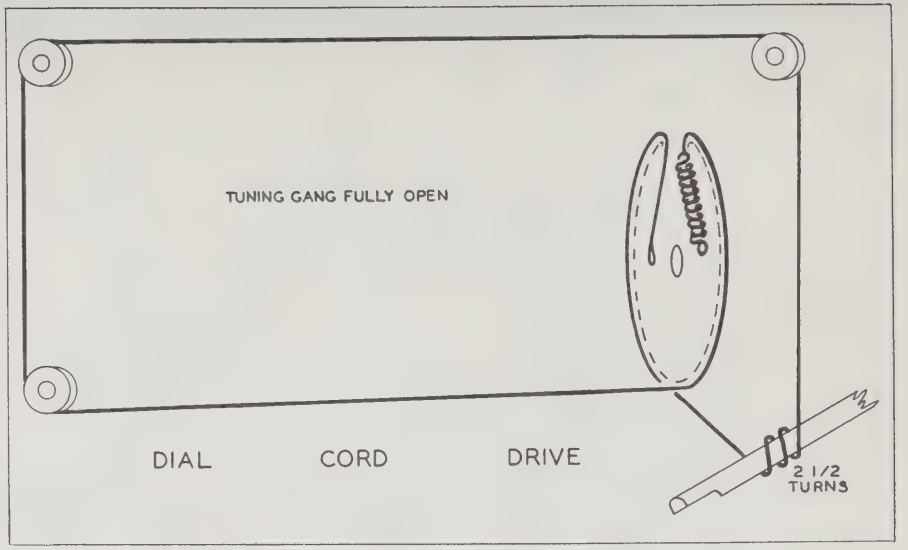
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
99	Switch	N21662	AM-FM
100	Rectifier	N20207-3	Selenium
101	Tuning Gang	N21401-2	(35-310MMF, 25-200MMF)
	Cabinet	N21635	
	Dial Pointer	N21604	
	Dial Scale	N21601	
	Knob	N21587	Tuning
	"	N21583	Volume
	"	N21589	Tone-On-Off
	"	N21590	AM-FM

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	
49A	1 Meg.	½	N21661	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 49A per instructions
50A	500KΩ	½	N21663	D13-133	M-60-Z	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 50A per instructions
C	Switch		" "	41	SW-A	" " " " "



RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	
51	1000Ω	½		BTS-1000	Br.-Blk.-Red Oscillator Plate Decoupling
52	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
53	68Ω	½			Blue-Gray-Blk. RF Cathode
54	330Ω	½			Or.-Or.-Br. RF Decoupling
55	220Ω	½			Red-Red-Br. Antenna Coil Loading-See Note
56	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
57	330Ω	½			Or.-Or.-Br. Converter Decoupling
58	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
59	68Ω	½			Blue-Gray-Blk. 1st IF Cathode
60	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st IF Decoupling
61	22KΩ	½		BTS-22K	Red-Red-Or. Diode RF Filter
62	68Ω	½			Blue-Gray-Blk. 2nd IF Cathode
63	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
64	100Ω	½			Br.-Blk.-Br. RF Filter
65	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
66	6800Ω	½		BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
67	6800Ω	½		BTS-6800	Blue-Gray-Red " " " "
68	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
69	220Ω	½		BW-½-220	Red-Red-Br. Output Cathode
70	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
71	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
72	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load
73	100Ω	1		BW-1-100	Br.-Blk.-Br. Filter
74	22Ω	1		BW-1-22	Red-Red-Blk. Surge Limiter
75	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Feedback

Note-Not used in all models.

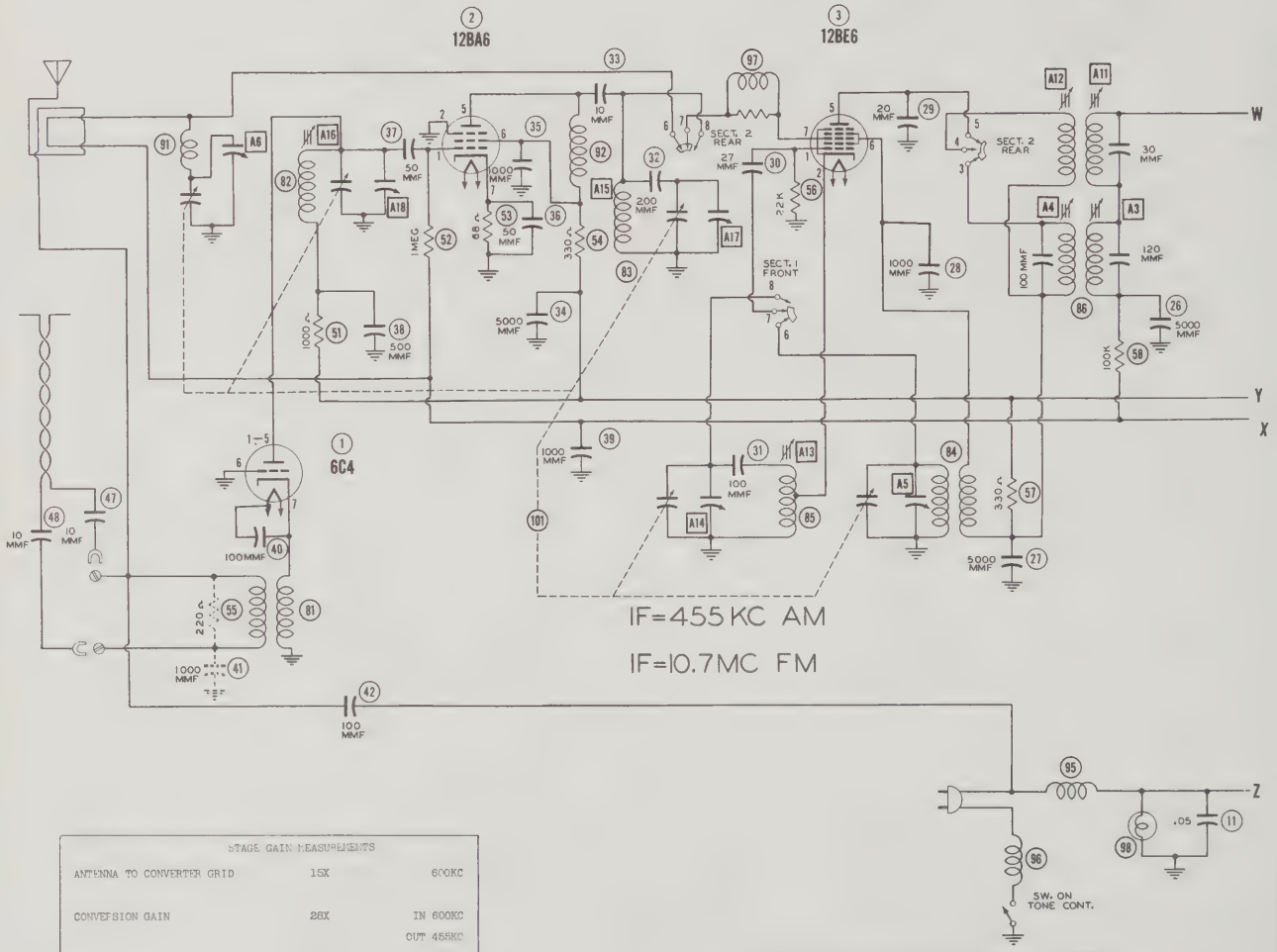
FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	SILVERTONE PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
76	63MA	215Ω	8 Henries	N21394-2			C-[illegible]77	

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
77	2500Ω	3.5Ω	108Ω	.3Ω	N21393-2	A-3876	T22S45	A-2028	

DATE 8/48-#4813-17 SET #43-FOLDER #17



STAGE GAIN MEASUREMENTS

ANTENNA TO CONVERTER GRID	15X	600KC
CONVERSION GAIN	28X	IN 600KC OUT 455KC
INPUT IF	.9X	455KC
IF TUBE	250X	455KC
OUTPUT IF	.5X	455KC
[illegible]	2.0X	[illegible]
OUTPUT	17X	400Ω

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6C4	55VDC	0V.	45VAC	40VAC	95VDC	0V.	0V.	-
‡ 2	12BA6	0V.	0V.	40VAC	25VAC	100VDC	100VDC	[illegible]VDC	-
‡ 3A	12BE6	-3VDC§	0V.	45VAC	60VAC	100VDC	100VDC	0V.	-
3B	12BE6	-[illegible]VDC§	0V.	45VAC	58VAC	100VDC	100VDC	0V.	-
4	12BA6	0V.	0V.	60VAC	70VAC	90VDC	90VDC	[illegible]VDC	-
‡ 5	12BA6	0V.	0V.	25VAC	17VAC	100VDC	90VDC	[illegible]VDC	-
‡ 6	12H6	0V.	17VAC	-.3VDC	0V.	0V.	127VAC	0VAC	.3VDC
7	6AL5	-.4VDC	0V.	0V.	6VAC	[illegible]VDC	0V.	[illegible]VDC	-
8	50L6GT	0V.	70VAC	115VDC	100VDC	0V.	0V.	[illegible]VAC	70VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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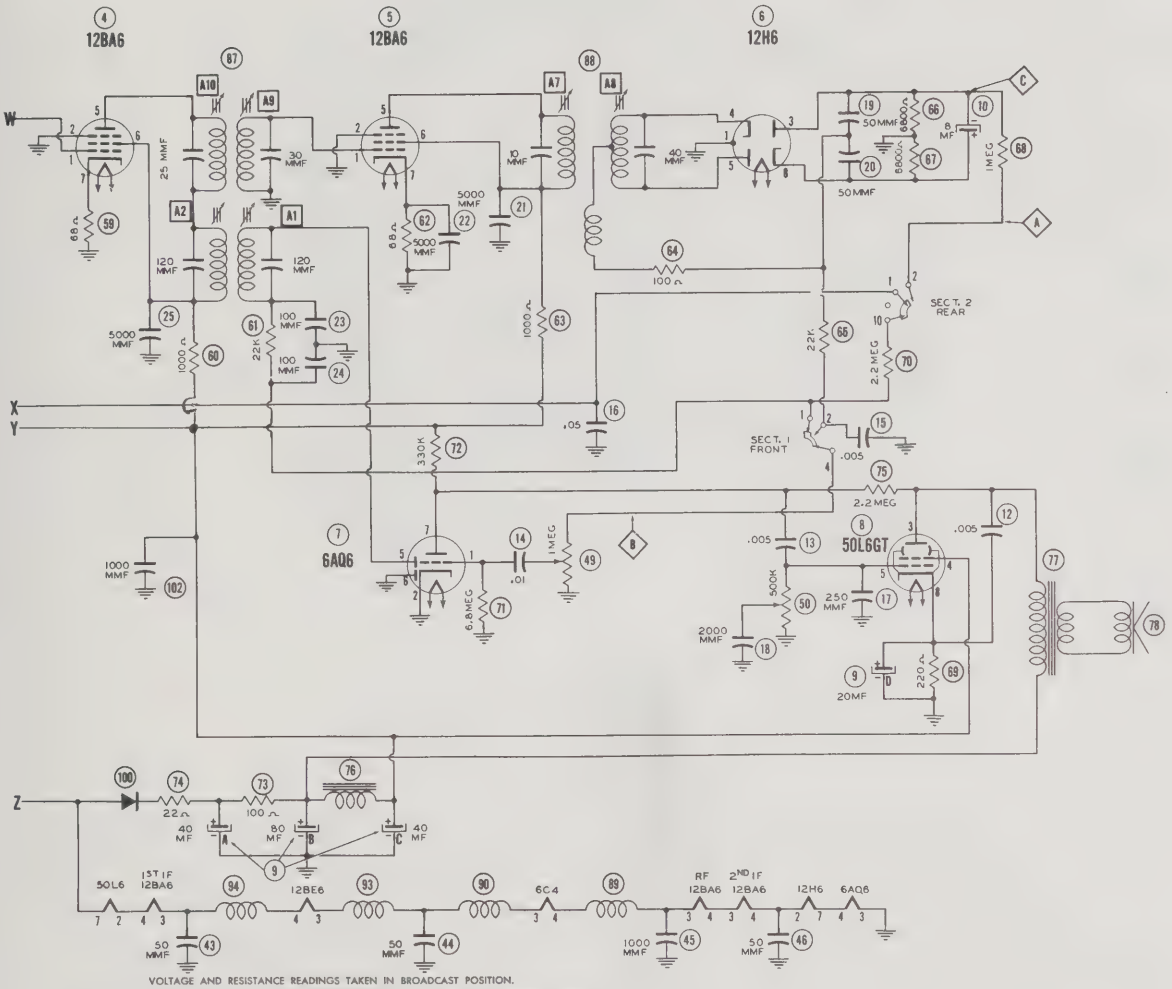

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
		RESISTANCE READINGS							
1	6C4	26KΩ	0Ω	43Ω	40Ω	26KΩ	0Ω	[illegible]	-
‡ 2	12BA6	2 Meg.	0Ω	30Ω	28Ω	25KΩ	25KΩ	[illegible]	-
‡ 3A	12BE6	22KΩ	0Ω	44Ω	52Ω	25KΩ	25KΩ	0Ω	-
3B	12BE6	22KΩ	0Ω	44Ω	52Ω	25KΩ	25KΩ	[illegible]	-
4	12BA6	3.3 Meg.	0Ω	54Ω	60Ω	26KΩ	26KΩ	[illegible]	-
‡ 5	12BA6	1Ω	0Ω	2.5Ω	18Ω	26KΩ	26KΩ	[illegible]	-
‡ 6	12H6	0Ω	18Ω	6.5KΩ	1 Meg.	1 Meg.	25KΩ	[illegible]	6.5KΩ
7	6AQ6	6.5 Meg.	0Ω	0Ω	6Ω	1 Meg.	0Ω	[illegible]	-
8	50L6GT	INF.	60Ω	25KΩ	25KΩ	500KΩ	450KΩ	[illegible]	2.2KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

HOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 7 (grid) of 12BE6. Low side to chassis.	455KC	AM (fully counter clock-wise)	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1400KC	"	1400KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.05 MFD.	High side to Pin 1 (grid) of 12BA6 2nd IF Tube (5). Low side to chassis.	10.7MC (Unmodulated)	FM (fully clock-wise)	Tuning cap. fully open.	DC probe to Point ◇. Common to chassis	A7	Adjust for maximum deflection.
5	.05 MFD.	"	"	"	"	DC probe to Point ◇. Common to chassis	A8	Use a zero-center scale meter if available. Adjust for zero deflection.
6	.05 MFD	High side to Pin 7 (grid) of 12BE6. Low side to chassis.	"	"	"	DC probe to Point ◇. Common to chassis	A9, A10, A11, A12	Adjust for maximum deflection.
7	220Ω carbon res.	High side to FM ant. terminal "A". Low side to FM ant. terminal "G". Disconnect blue lead to "A" terminal.	88MC	"	88MC	"	A13	"
8	"	"	108MC	"	108MC	"	A14	Adjust for maximum deflection. Repeat Steps 7 & 8 until no further improvement can be made.
9	"	"	91MC	"	Tune for maximum deflection.	"	A15, A16	Adjust for maximum deflection.
10	"	"	105MC	"	"	"	A17, A18	Adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

In Steps 4 & 5 disconnect parasitic suppressor (coil wound on resistor, #97) from Pin 7 of 12BE6. Solder a 100KΩ resistor from Pin 7 of 12BE6 to chassis, keeping leads as short as possible.

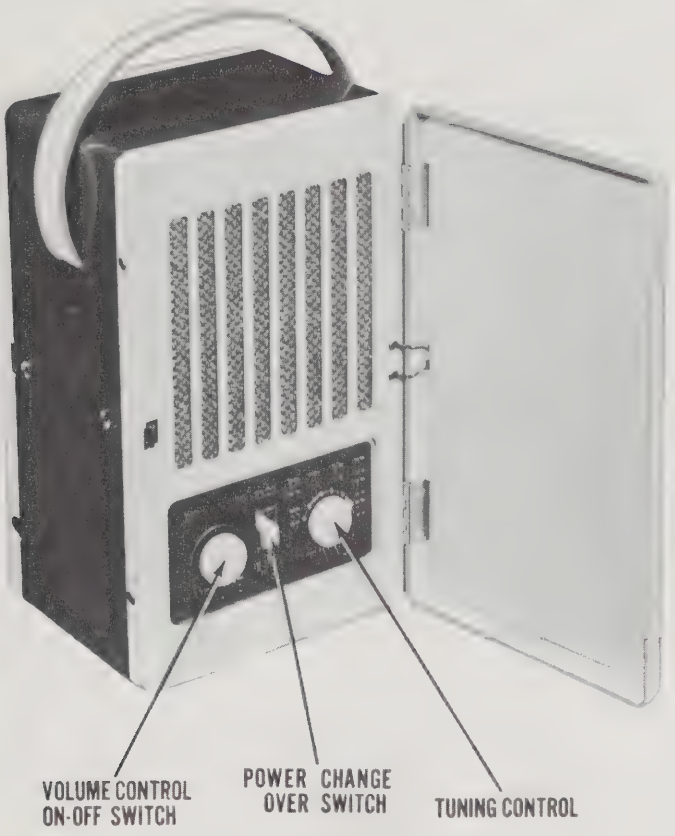
Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	.05 MFD.	See scope pre-alignment notes. High side to Pin 7 (grid) of 12BE6. Low side to chassis.	10.7MC (Freq. Mod.)	FM (fully clock-wise)	Tuning cap. fully open.	Vertical input to Point ◇. Ground to chassis.	A7, A9, A10, A11, A12	Disconnect 8 MFD cap. from Point ◇. Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
5	.05 MFD	"	"	"	"	Vertical input to Point ◇. Ground to chassis.	A8	Reconnect 8 MFD. cap. to Point ◇. Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Reconnect coil (97) to Pin 7 of 12BE6 and remove 100KΩ resistor.
6	220Ω carbon res.	High side to FM ant. terminal "A". Low side to FM ant. terminal "G". Disconnect blue lead to "A" terminal.	88MC	"	88MC	Vertical input to Point ◇. Ground to chassis.	A13	Disconnect 8 MFD. cap. from Point ◇. Adjust A13 for coincidence of pattern per Fig. 1.
7	"	"	108MC	"	108MC	"	A14	Adjust for coincidence of pattern per Fig. 1. Repeat Steps 6 & 7 until no further improvement can be made.
8	"	"	91MC	"	Tune for coincidence of pattern.	"	A15, A16	Adjust for maximum amplitude of pattern per Fig. 1.
9	"	"	105MC	"	"	"	A17, A18	Adjust for maximum amplitude of pattern per Fig. 1. Repeat Steps 8 & 9 until no further improvement can be made. Reconnect 8 MFD cap. to Point ◇.

FIG. 1

FIG. 2

TEMPLE MODEL G-415
BATTERY-LINE OPERATED



TEMPLE MODEL G-415
BATTERY-LINE OPERATED

TEMPLE MODEL G-415

TRADE NAME	Temple, Model G-415
MANUFACTURER	Templetone Radio Mfg. Corp., Garfield Ave., New London, Conn.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1L4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY RATING	105-120 Volts AC-DC or 7.5 Volts "A" Supply and 67.5 Volts "B" Supply .17 Amp. @ 117 Volts AC or 67MA @ 7.5 Volts DC and 23MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1625KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy ant. to 200 MMF to reduce hum modulation.
2		Loop	1625KC	"	"	A4	Install receiver in cabinet. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1550KC	Tune for maximum output.	"	A5	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TEMPLE MODEL G-415

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1L4	1L4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TEMPLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	25	150	CE89	PRSA302010	UP4CJ62	DY-304#	EL-351	Filter-Red
B	25	150				"		" -Grn.
C	200	10				M-100-15		Filament Bypass-Yl.
6	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Line Filter
7	.002	600		684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
8	.1	400		484-.1	DT4P1	ST-4-1	72P2	Line Isolation
9	.05	200		484-05	DT2S5	ST-4-05	TC-15	AF Plate Decoupling
10	.002	600		684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
11	.01	200		484-01	DT2S1	ST-4-01	TC-11	AF Screen Bypass
12	.005	200		484-005	DT6D5	ST-4-005	TC-25	Audio Coupling
13	.05	200		484-05	DT2S5	ST-4-05	TC-15	Filament Bypass
14	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
15	.05	200		484-05	DT2S5	ST-4-05	TC-15	RF Bypass
16	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Filament Bypass
17	.05	200		484-05	DT2S5	ST-4-05	TC-15	" "
18	.05	400		484-05	DT2S5	ST-4-05	72P1	Line Isolation
19	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
20	22	500		1468-000025	5W5Q2	MO.5-42	MS-42	RF Coupling
21	68	500						Fixed Trimmer
22	33	500		1468-00004	5W5Q4	MO.5-44	1FM-44	Osc. Grid Cap.

#Parallel sections to obtain desired capacity.

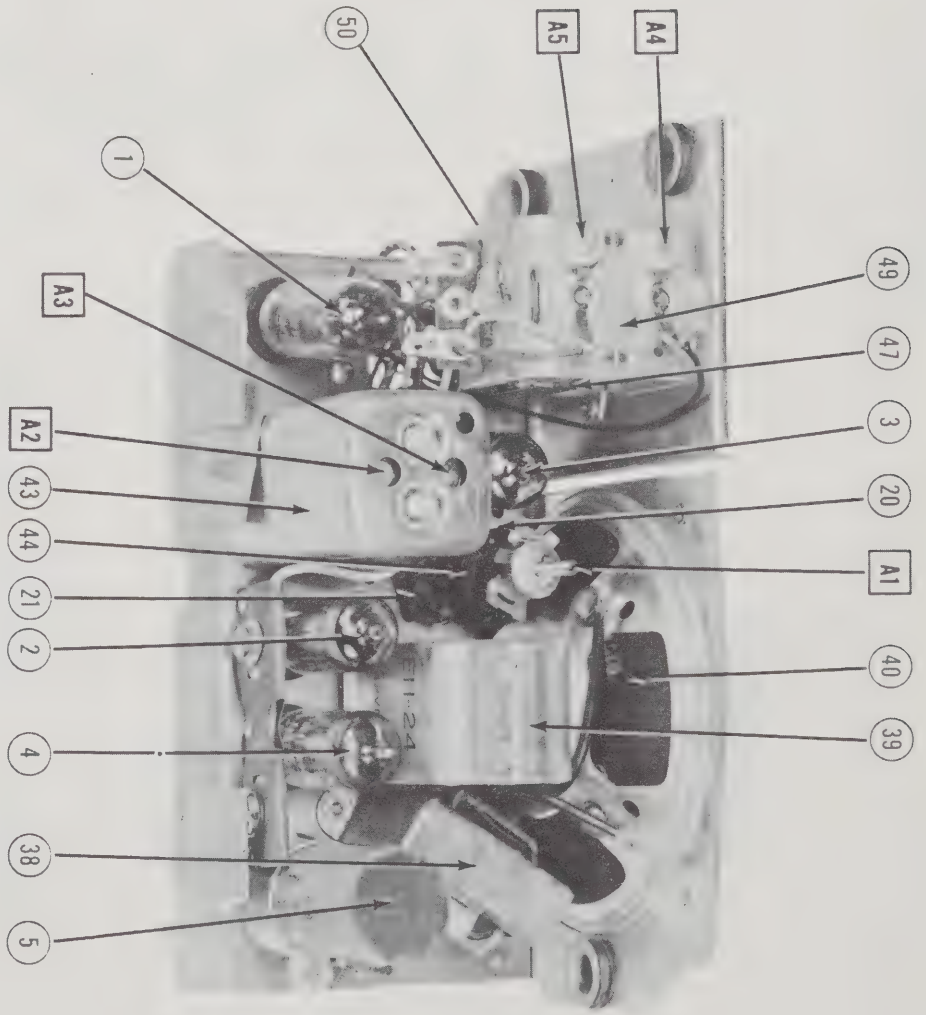
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TEMPLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
23A	2 Meg.	½	RP-19		AM-83-S	Volume Control
B	Shaft		Not Req.		KSS-3	Attach to 23A per instructions
C	Switch		" "		SW-A2	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TEMPLE PART No.	IRC PART No.	IDENTIFICATION CODES
24	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
25	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
26	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. " "
27	2200Ω	½		BTS-2200Ω	Red-Red-Red Converter Screen Dropping
28	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode RF Filter
29	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Diode Load
30	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
31	680KΩ	½		BTS-680K	Blue-Gray-Yl. AF Plate Load
32	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Decoupling

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TEMPLE PART No.	IRC PART No.	
33	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Output Grid
34	270Ω	½		BW-½-270	Red-Vi.-Br. Filament String
35	560Ω	½		BTS-560	Grn.-Blue-Br. " "
36A	1500Ω	10		AB-1500	Filament Dropping
B	700Ω			ABA-750	Filter-See Note
37	22Ω	1		BW-1-22	Red-Red-Blk. Surge Limiter
50	1000Ω	½		BTS-1000	Br.-Blk.-Red Filter

Note-On IRC replacement set slider at 700Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TEMPLE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
38	8500Ω	3Ω	650Ω	.8Ω		A-3848	T22847	A-2998†	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TEMPLE PART No.	JENSEN. PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113*		*Drill new mounting holes and trim flange.
39	PM	3Ω	EH-24	Mod. P4-X	4A15*	
	CONE DIA.	VC DIA.				
40	4"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TEMPLE PART No.	MEISSNER PART No.	
41	Loop Ant.		5Ω			
42	Osc. Coil	1.8Ω	5.2Ω			
43	Input IF	14.2Ω	20.2Ω	TM2-16	16-5712	
44	Output IF	9.8Ω		TM-16		

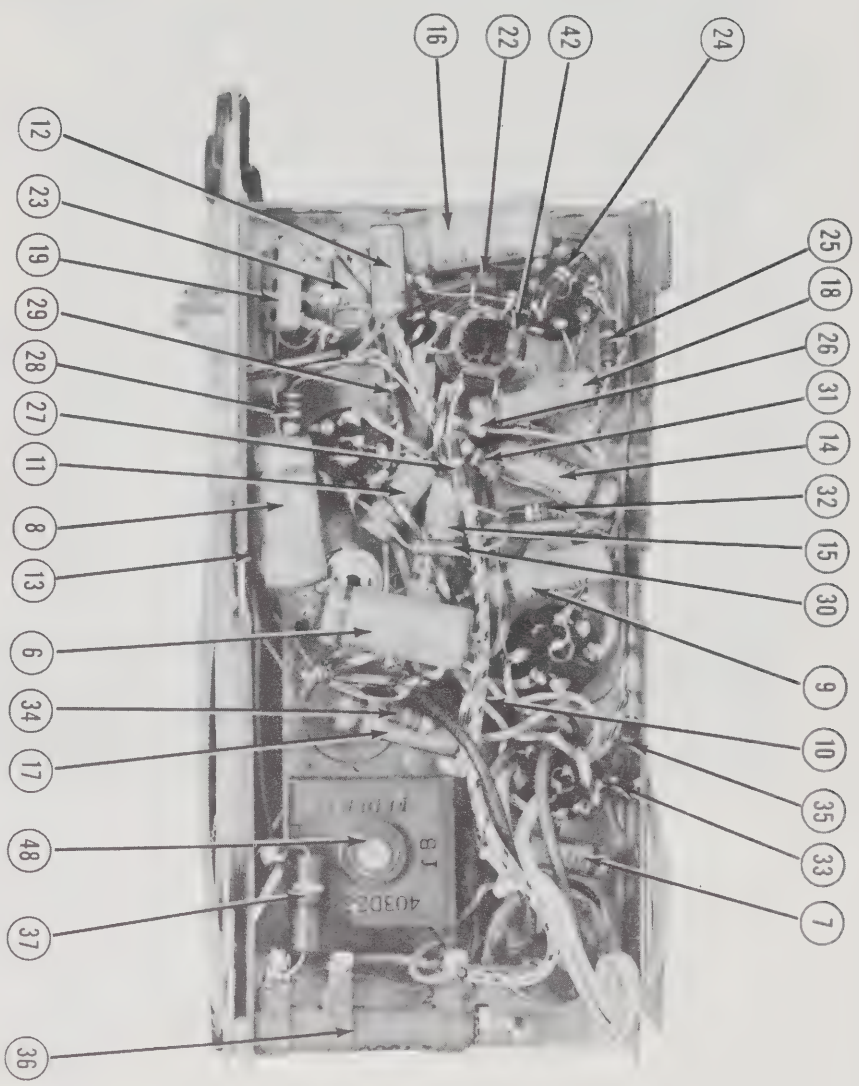
BATTERIES

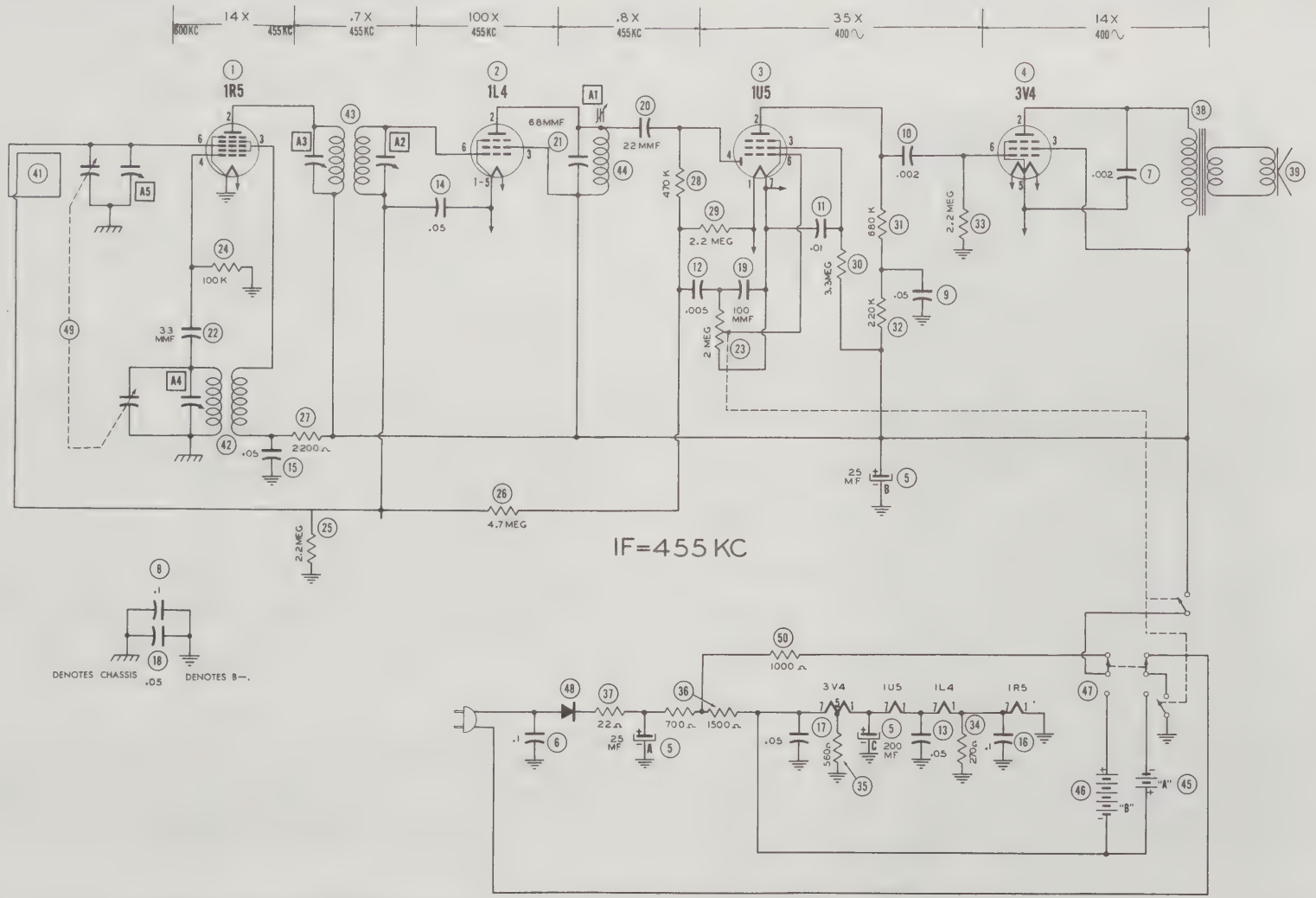
ITEM No.	VOLTAGE	TEMPLE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
45	7.5V "A"	GB1				B5P1			
46	67.5V"B"			#467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	TEMPLE PART No.	NOTES
47	Switch		AC/DC-Batt.
48	Rectifier	ED1	Selenium
49	2 Gang Var. Cap.	CV25	(30-385MMF, 30-170MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	73VDC	68VDC	-22VDC§	0V.	.1VDC	1.3VDC
2	1L4	1.3VDC	73VDC	73VDC	0V.	1.3VDC	.1VDC	2.6VDC
3	1U5	1.6VDC	12VDC	16VDC	.2VDC	0V.	.2VDC	3.9VDC
4	3V4	3.2VDC	73VDC	73VDC	0V.	5.2VDC	0V.	6.7VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	2.2KΩ	4.4KΩ	100KΩ	0Ω	2 Meg.	*
2	1L4	*	2.2KΩ	2.2KΩ	INF.	*	2 Meg.	*
3	1U5	*	500KΩ	3.3 Meg.	2.2 Meg.	INF.	2 Meg.	*
4	3V4	*	2.2KΩ	2.2KΩ	0Ω	*	2.2 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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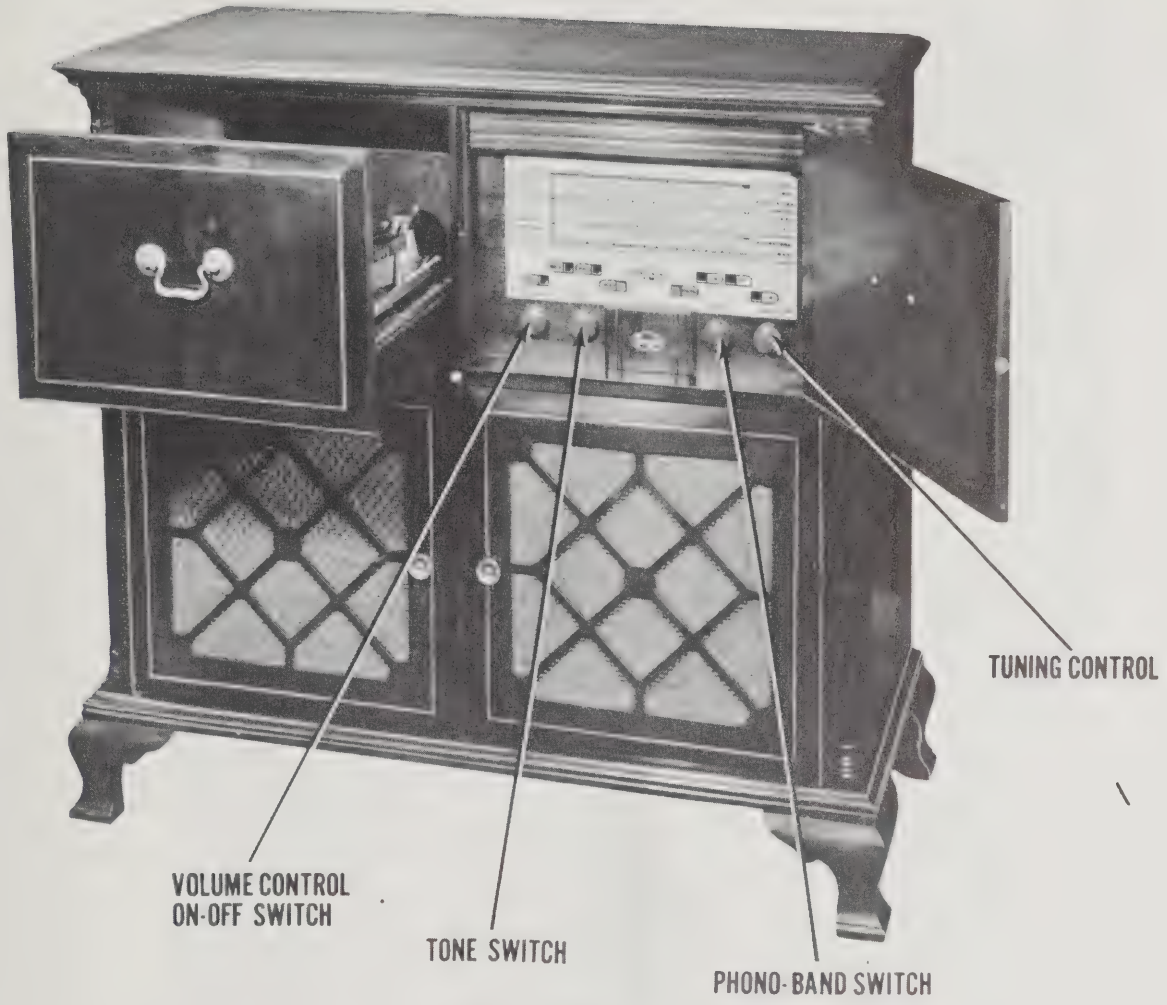
4813-18

The stage gain measured values listed above are approximate values for an average stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin 1 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

TEMPLE MODEL
G-1430



TEMPLE MODEL
G-1430

TEMPLE MODEL G-1430

TRADE NAME	Temple, Model G-1430
MANUFACTURER	Templetone Radio Mfg. Corp., Garfield Ave., New London, Conn.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band AM-FM Superheterodyne Receiver with Loop Antenna.
TUBES(FOURTEEN)	Types, 7H7 FM RF Amp., 6SB7Y FM Mixer, 7A4 FM Osc., 7Q7 AM Converter, 7H7 1st IF Amp., 7H7 2nd IF Amp., 7H7 AM Det.-FM 3rd IF, 7C7 FM Cath. Follower, 7A6 FM Ratio Det., 1273 AF Amp., 7A4 Cathode Follower Driver, (2) 7C5 Power Output, 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	1.07 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1720KC SHORT WAVE 5.6-18.5MC FREQ. MOD. 87.4-108.7MC

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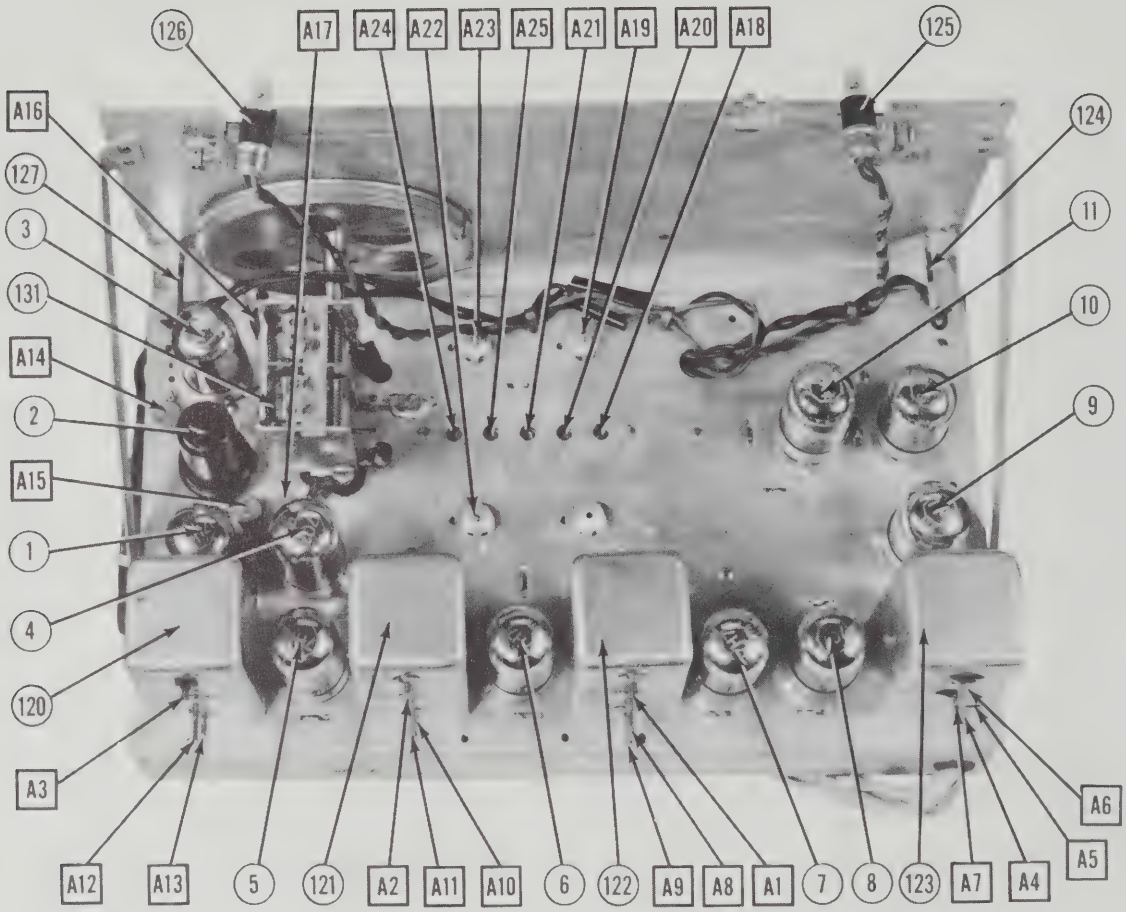
DATE 8/48-#4813-19 SET #43-FOLDER #19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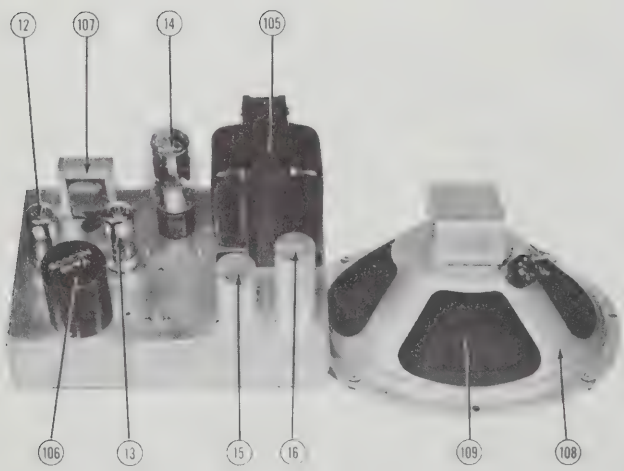
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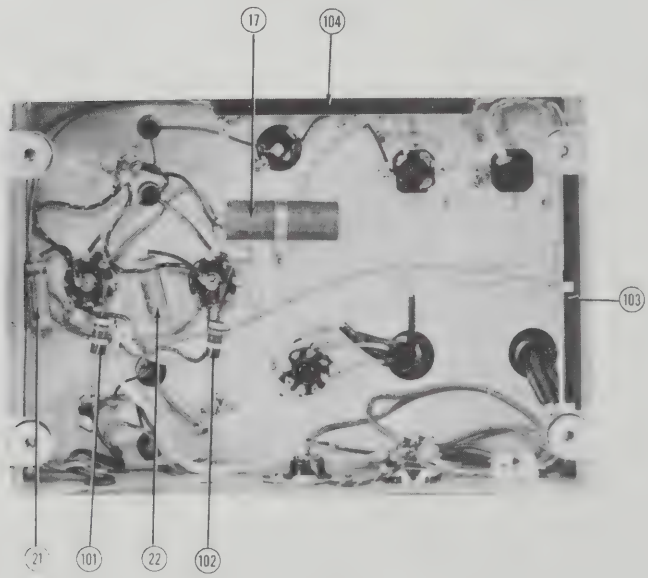
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TEMPLE MODEL G-1430

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	7H7	7H7	8V	
2	FM Mixer	6BA7Y	6BA7Y	8K	
3	FM Oscillator	7A4	7A4	8AC	
4	AM Converter	7A7	7A7	8AL	
5	1st IF Amp.	7H7	7H7	8V	
6	2nd IF Amp.	7H7	7H7	8V	
7	AM Det.-FM 3rd IF	7H7	7H7	8V	
8	FM Cath. Follower	7C7	7C7	8V	
9	FM Ratio Det.	7A6	7A6	7AJ	
10	AF Amp.	1273	1273		
11	Cath. Follower Driver	7A4	7A4	8AC	
12	Power Output	7C5	7C5	6AA	
13	" "	7C5	7C5	6AA	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TEMPLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
15A	16	450	CE1-3A85	AF444J	UP2232451	DY-3x20-450	EL-420†	▲ Filter
B	16	450						◘ "
C	16	450						▲ "
16	80	450	CE1-1A88	AF88J#	UP8045	DY-80-450	EL-240#	"
17A	25	50	CE-83	PRSA150/30-30	EZ2215	DSB-2x30-150	TA-330	Cathode Bypass
B	25	50						" "
18	25	25	CE-86	PRS25/25	BR252A	M-25-25	TA-25	" "
19	5	50	CE-88	PRS150/4	BR550	M-8-150	TA-55	Stabilizing Cap.
20	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Line Filter
21	.005	1000		1084-005	MD16D3	ST-16-003	TR-23	Output Plate Bypass
22	.005	1000		1084-005	MD16D3	ST-16-003	TR-23	" " "
23	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
24	.05	600		6S4-05	DT6S5	ST-6-05	TC-15	AF Screen Bypass
25	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
26	.003	600		6S4-003	DT6D3	ST-6-003	TC-23	Tone Comp.
27	.003	600		684-003	DT6D3	ST-6-003	TC-23	" " "
28	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
29	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass
30	.01	600		684-01	DT6S1	ST-6-01	TC-11	FM Plate Bypass
31	.01	600		684-01	DT6S1	ST-6-01	TC-11	Filament Bypass
32	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
33	.01	600		684-01	DT6S1	ST-6-01	TC-11	3rd IF Decoupling
34	.01	600		684-01	DT6S1	ST-6-01	TC-11	3rd IF Screen Bypass
35	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Decoupling
36	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
37	.01	600		684-01	DT6S1	ST-6-01	TC-11	Filament Bypass
38	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter-See Note
39	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Decoupling
40	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
41	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Cathode Bypass
42	.5	600		684-.5	DT6D5	ST-6-5	TC-5	RF Bypass Pwr. Supply
43	.01	600		684-01	DT6S1	ST-6-01	TC-11	Mixer Plate Decoupling
44	.01	600		684-01	DT6S1	ST-6-01	TC-11	Mixer Screen Bypass
45	.01	600		684-01	DT6S1	ST-6-01	TC-11	Mixer Cathode Bypass
46	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
47	.01	600		684-01	DT6S1	ST-6-01	TC-11	Conv. Screen Bypass
48	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
49	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Power Supply
50	220	500		1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
51	47	500		1468-00005	5W5T5	MO.5-45	1FM-45	Tone Comp.
52	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	" "
53	1000	500		1468-001	1W5D1	MO.3-21	1FM-21	" " - See Note
54	220	500		1468-00025	5W5T25	MO.5-325	1FM-325	De-emphasis
55	4700	500		1467-005	1D5D5	MW.5-25	1FM-25	Diode Load Cap.
56	100	500		1468-001	5W5T1	MO.5-31	1FM-31	IF Coupling
57	22	500		1468-00035	5W5.25	MO.5-425	MS-425	Mixer Cathode Bypass
58	100	500		1468-001	5W5T1	MO.5-31	1FM-31	Filament Bypass

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	RATING: TRANS RATIO PRI. to SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
106	3 to 1	1130Ω	360Ω CT	TA-10		T20D77‡		‡Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
107	9000Ω CT	3.9Ω	400Ω CT	.3Ω		A-3823	T22S56	A-2936	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-10Z*		
108	PM	3.9Ω	EH-16	Mod. P12-S	12A6*	*Replace output transformer to match 6-7Ω voice coil.
	COIL DIA.	VC DIA.				
109	11/16"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: MEISSNER PART No.	
110	Ant. Load. Coil		0Ω	LF-8		
111	BC Ant.Coil	2.3Ω	17.3Ω	LR-14	14-1056	
112	SW " "	0Ω	1Ω	LR-15		
113	FM Ant.Coil		0Ω	LR-12		
114	Plate Coup. Coil		2.5Ω	LF-7		
115	FM RF Coil		0Ω	LR-13		
116	FM RF Pad Coil		0Ω	LF-6		
117	BC Osc.Coil	.2Ω	4Ω	LO10	14-1060	
118	SW " "		.1Ω	LO11		
119	FM " "		0Ω	LO9		
120A	1st IF AM	1Ω		TM-6		
B	1st IF FM	.1Ω	.1Ω			
121A	2nd IF AM	1Ω**		TM-7		**Includes both primaries.
B	2nd IF FM					
122A	3rd IF AM	1Ω**		TM-8		
B	3rd IF FM					
123	Det. Coil		.2Ω	TM-17		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
124-128	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	TEMPLE PART No.	NOTES
129	Switch	SR18	Band-Phono
130	"	SR19	Tone
131	Tuning Gang	CV15	AM (13-417MMF, 13-417MMF)

PARTS LIST AND DESCRIPTIONS (Continued)

59	220	500		1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.
60	25	500		1468-00025	5R5Q25	MOS.5-425	1FM-425	Grid Feedback
61	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass
62	25	500		1468-000025	5R5Q25	MOS.5-425	1FM-425	Fixed Pad
63	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
64	220	500		1468-00025	5W5T25	MO.5-325	1FM-325	RF Screen Bypass
65	33	500		1468-00004	5W5Q4	MO.5-44	1FM-44	RF Coupling
66	3600	500						Fixed Pad
67	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
68	47	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer

†Omit one section.
#Parallel sections to obtain desired capacity.
Note-Not used in all models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TEMPLE PART No.	IRC PART No.	CLAROSTAT PART No.	
69	1 Meg.	½	RP11-105			Volume Control & Sw. tapped @ 150KΩ & 300KΩ

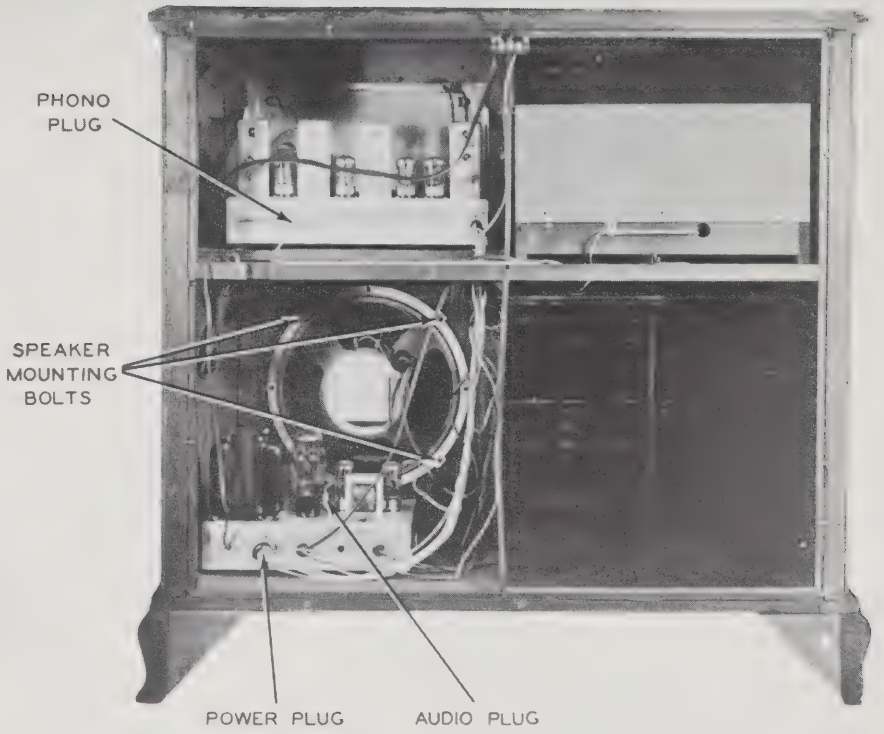
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TEMPLE PART No.	IRC PART No.	
70	15KΩ	½		BTS-15K	Br.-Grn.-Or. RF Screen
71	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
72	4700Ω	2		BT-2-4700	Yl.-Vi.-Red RF Plate Load
73	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
74	22KΩ	1		BTA-22K	Red-Red-Or. AM Osc. Screen
75	4700Ω	1		BTA-4700	Yl.-Vi.-Red FM Osc. Plate
76	12KΩ	½		BTS-12K	Br.-Red-Or. FM Osc. Grid
77	220Ω	½			Red-Red-Br. Mixer Cathode
78	22KΩ	2		BT-2-22K	Red-Red-Or. Mixer Screen
79	150Ω	½			Br.-Grn.-Br. 1st IF Cathode
80	33KΩ	½		BTS-33K	Or.-Or.-Or. 1st IF Screen
81	150Ω	½			Br.-Grn.-Br. 2nd IF Cathode
82	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd IF Screen
83	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
84	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load
85	1000Ω	½		BTS-1000	Br.-Blk.-Red Decoupling
86	47KΩ	½		BTS-47K	Yl.-Vi.-Or. FM 3rd IF Screen
87	15KΩ	½		BTS-15K	Br.-Grn.-Or. FM 3rd IF Plate
88	47KΩ	½		BTS-47K	Yl.-Vi.-Yl. FM Cathode Follower Grid
89	2200Ω	½		BTS-2200	Red-Red-Red FM Cathode Follower Cathode
90	47KΩ	½		BTS-47K	Yl.-Vi.-Or. De-emphasis
91	22KΩ	½		BTS-22K	Red-Red-Or. Ratio Det. Diode Load
92	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phono Shunt
93	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AF Amp. Grid
94	2200Ω	½		BTS-2200	Red-Red-Red AF Amp. Cathode
95	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Amp. Screen
96	220KΩ	½		BTS-220K	Red-Red-Yl. AF Amp. Plate Load
97	68KΩ	½		BTS-68K	Blue-Gray-Or. Tone Compensation
98	22KΩ	½		BTS-22K	Red-Red-Or. " "
99	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Driver Grid
100	3Ω	1		BW-1-3.3	Or.-Blk.-Blk. *Fil. Dropping
101	470Ω	2		BW-2-470	Yl.-Vi.-Br. Output Cathode
102	470Ω	2		BW-2-470	Yl.-Vi.-Br. " "
103A	200Ω	10	RW3-2	AB-200	Filter
B	800Ω	10		AB-800	"
104A	200Ω	10	RW3-8	AB-200	"
B	800Ω	10		AB-800	"
132	1000Ω	½		BTS-1000	Br.-Blk.-Red Decoupling

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	TEMPLE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
105	117V AC @ 1.07A	700V CT @ .3A	4.8V AC @ 3.0A	6.3V AC @ 4.5A	TP-10	P-4081§	T-22R33‡	P-3155§

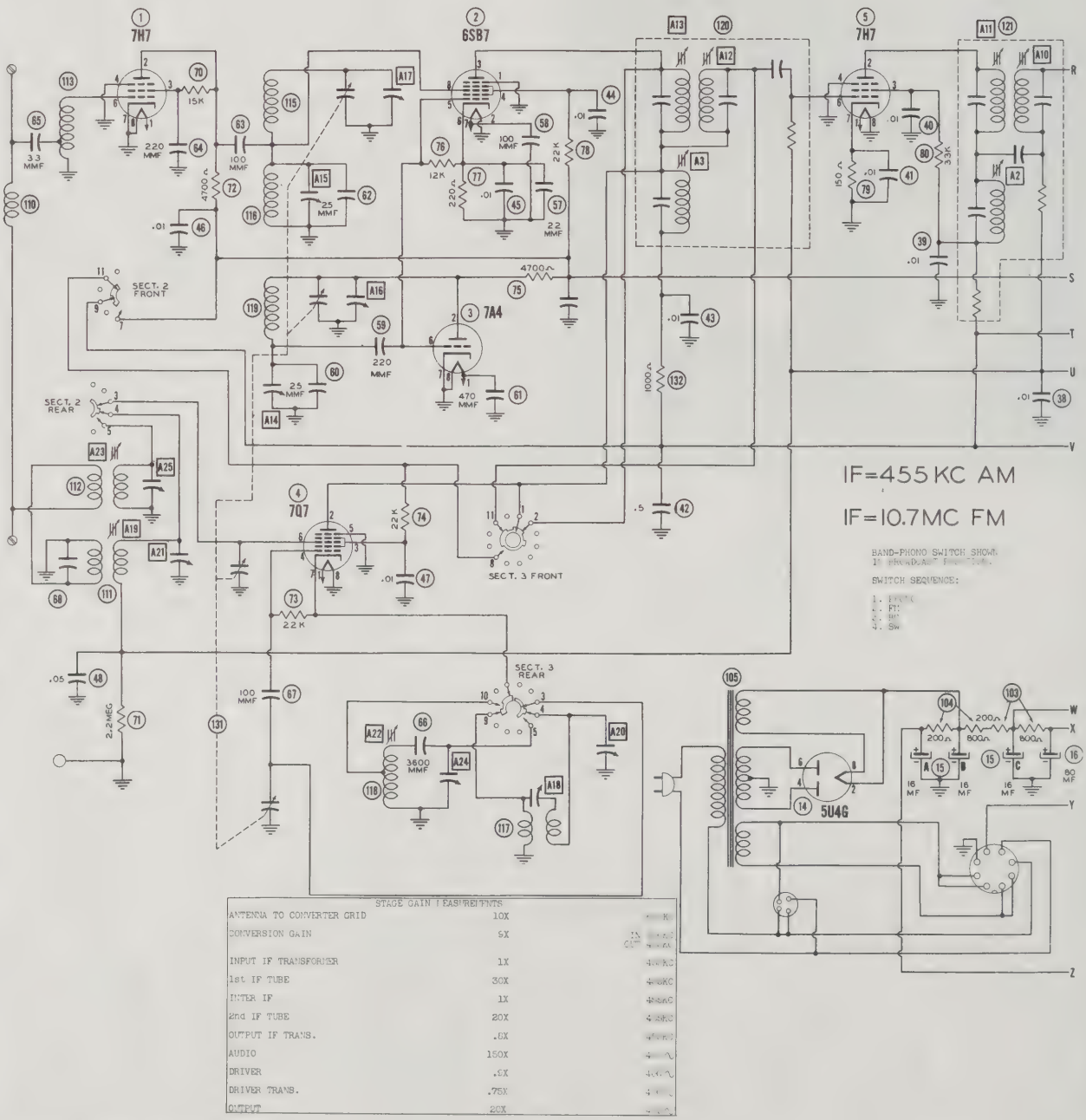
‡Drill new mounting holes.
§Add series resistor to reduce plate voltage.



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove power supply, audio amp. and phono-motor plugs from power supply chassis.
3. Remove speaker plug from speaker.
4. Remove four screws from under power supply chassis mounting board and remove power supply chassis from cabinet.
5. Remove FM antenna leads from antenna terminal strip.
6. Remove two Phillips head wood screws holding FM antenna terminal strip to cabinet.
7. Remove phono-pickup plug from tuning chassis.
8. Remove four screws from under tuning chassis mounting board. Remove tuning chassis from cabinet.
9. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

DATE 8/48-#4812-1C SET #43-FOLDER #19



STAGE GAIN MEASUREMENTS

ANTENNA TO CONVERTER GRID	10X	
CONVERSION GAIN	5X	
INPUT IF TRANSFORMER	1X	
1st IF TUBE	30X	
INTER IF	1X	
2nd IF TUBE	20X	
OUTPUT IF TRANS.	.6X	
AUDIO	150X	
DRIVER	.9X	
DRIVER TRANS.	.75X	
OUTPUT	20X	

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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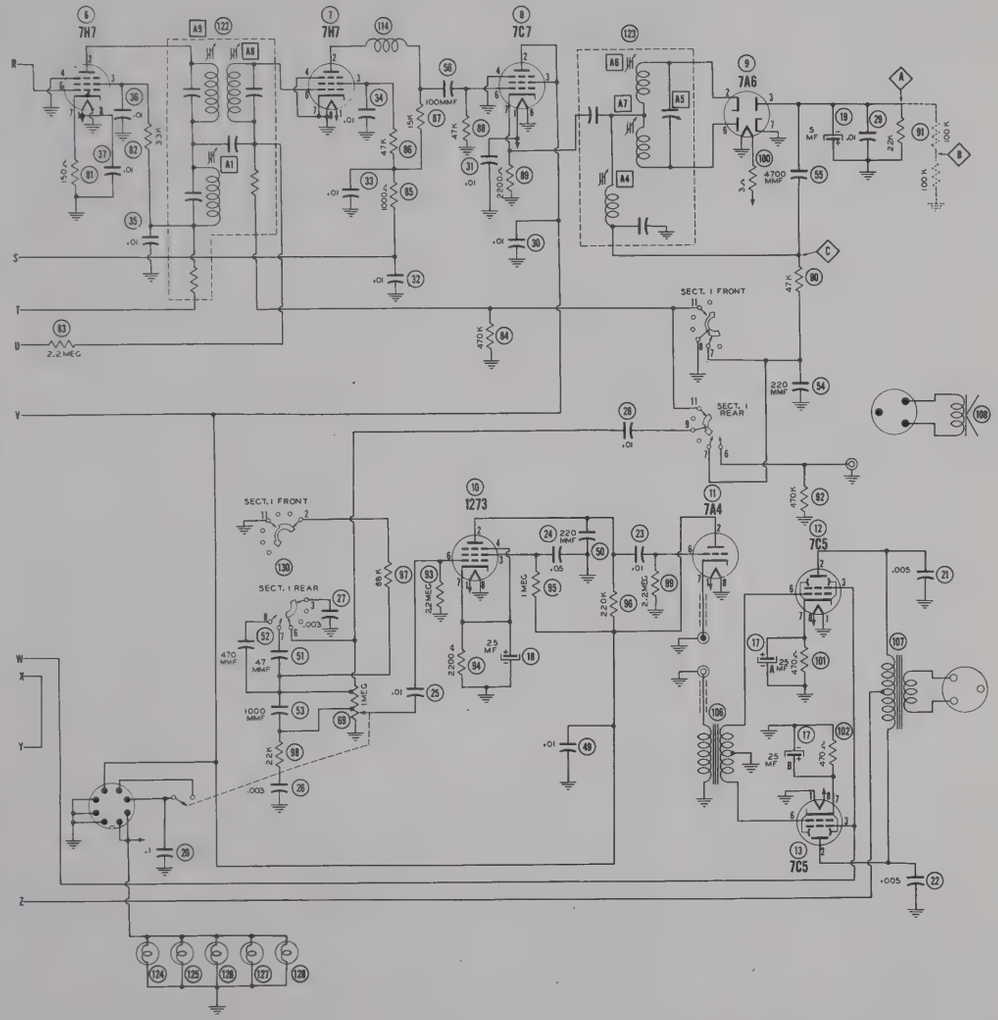
4813-19

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.


7H7
7H7
7C7
7A6
SECT. I FRONT
SECT. I REAR
1273
7A4
7C5
7C5
2.2 MEG
470K
220 MMF
68 K
1 MEG
2200 A
2.2MEG
220K
2.2MEG
470K
25 MF
470K
25 MF
470 MMF
47 MMF
1000 MMF
1 MEG
2.2K
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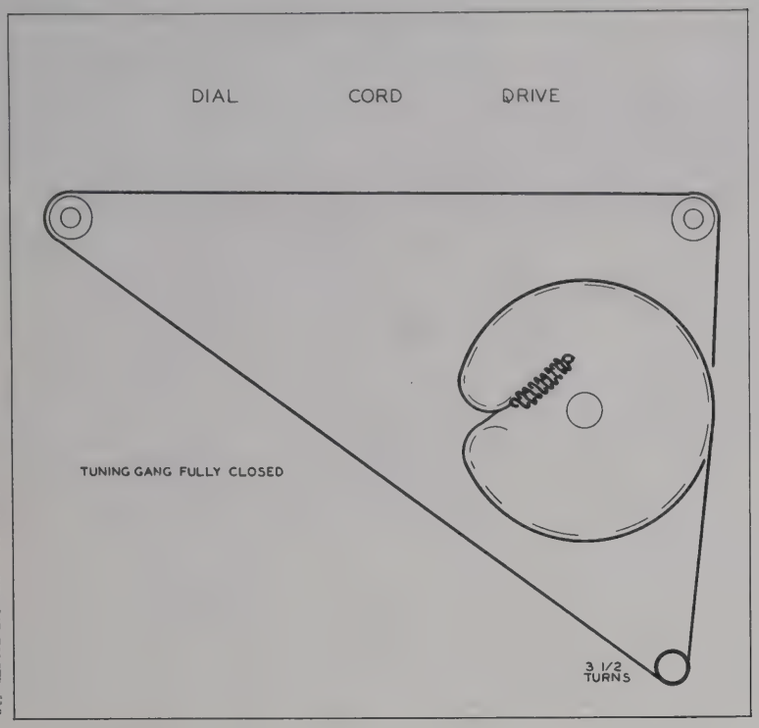


FIG. 1

FIG. 2

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 3-1/8" from left edge of dial backplate. This is the calibration mark referred to below.
Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC. (2 positions clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,	Adjust for maximum output

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.
In Step 3 connect 2-100KΩ resistors in series from Point A to chassis. The values of these two resistors must be within 1% of each other. The junction of these two resistors is Point B. (See schematic).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD	High side to Pin 6 (grid) of 7H7 3rd IF Tube (7). Low side to chassis.	10.7MC (unmodulated)	FM (1 position clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A4	Adjust for maximum deflection.
3	.01 MFD	"	"	"	"	DC probe to Point (B). Common to Point (C). (See realignment notes)	A5	Adjust for zero deflection.
4	.01 MFD	"	10.4MC (Unmodulated)	"	"	DC probe to Point (A). Common to chassis	A6	Adjust for maximum deflection.
5	.01 MFD	"	11.0MC (unmodulated)	"	"	"	A7	Adjust for maximum deflection. Repeat Steps 3, 4 & 5 until no further improvement can be made making Step 3 last adjustment. Disconnect 2-100KΩ resistors.
6	.01 MFD	High side to Pin 6 (grid) of 7H7 2nd IF Tube (6). Low side to chassis.	10.7MC (Unmodulated)	"	"	"	A8,A9	Adjust for maximum deflection.
7	.01 MFD	High side to Pin 6 (grid) of 7H7 1st IF Tube (5). Low side to chassis.	"	"	"	"	A10, A11	"
8	.01 MFD.	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	"	"	"	"	A12, A13	"
9	300Ω carbon res.	High side to terminal "A" on ant. terminal strip. Low side to terminal "D".	92MC	"	1-3/4" from calibration mark.	"	A14, A15	"
10	"	"	106MC	"	5-11/16" from calibration mark.	"	A16, A17	Adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made. Continue with AM-RF Alignment.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60∿ modulation and 450KC sweep except in Step 5 where 225KC sweep is used.
Use 120∿ sawtooth voltage in scope for horizontal deflection.

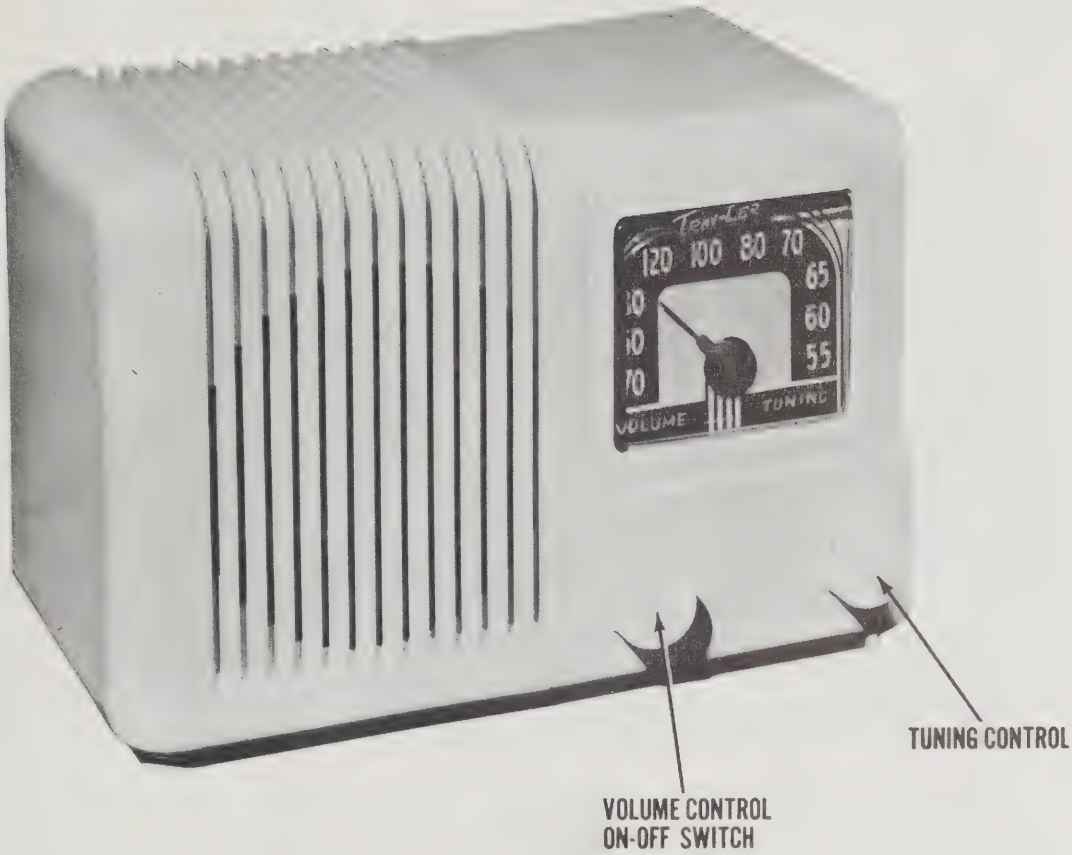
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
2	.01 MFD	High side to Pin 6 (grid) of 7H7 2nd IF Tube(6). Low side to chassis.	10.7MC (Freq. Modulated)	FM	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A4,A8, A9	Disconnect 5 MFD cap. from Point (A). Adjust A4, A8,& A9 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	High side to Pin 6 (grid) of 7H7 1st IF Tube (5). Low side to chassis.	"	"	"	"	A10, A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
4	.01 MFD	Unsolder lead from Pin 8 of 6SB7Y. Connect 100KΩ resistor from Pin 8 to chassis making leads as short as possible. High side signal gen. to Pin 8. Low side to chassis.	"	"	"	"	A12, A13	"
5	.01 MFD	"	10.7MC (Freq. Modulated 225KC sweep)	"	"	Vertical input to Point (C). Ground to chassis.	A5,A6, A7	Reconnect 5 MFD cap. to Point (A). Alternately adjust A6 & A7 for peaks occurring about 200KC either side of center of pattern and A5 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Remove 100KΩ resistor from Pin 8 of 6SB7Y and reconnect lead to Pin 8.
6	300Ω carbon res.	High side to terminal "A" of ant. terminal strip. Low side to terminal "D".	92MC (Freq. Modulated)	"	1-3/4" from calibration mark.	Vertical input to Point (A). Ground to chassis.	A14, A15	Disconnect 5 MFD cap. from Point (A). Alternately adjust A14 for coincidence and A15 for maximum amplitude of pattern per Fig. 1.
7	"	"	106MC (Freq. Modulated)	"	5-11/16" from calibration mark.	"	A16, A17	Alternately adjust A16 for coincidence and A17 for maximum amplitude of pattern per Fig. 1. Repeat Steps 6 & 7 until no further improvement can be made. Reconnect 5 MFD cap. to Point (A) and continue with AM RF Alignment.

AM RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
11	200MMFD	High side to terminal "D" on ant. terminal strip. Low side to chassis.	600KC	BC	2-1/4" from calibration mark.	Across voice coil	A18, A19	Adjust for maximum output
12	200MMFD	"	1550KC	"	6-1/4" from calibration mark.	"	A20, A21	Adjust for maximum output Repeat Steps 11 & 12 until no further improvement can be made.
13	400Ω carbon res.	"	6MC	SW (fully clockwise)	13/16" from calibration mark.	"	A22, A23	Adjust for maximum output
14	"	"	18MC	"	6-26/32" from calibration mark.	"	A24, A25	Adjust for maximum output Repeat Steps 13 & 14 until no further improvement can be made.

TRAV-LER MODEL 5021
BATTERY OPERATED



TRAV-LER MODEL 5021
BATTERY OPERATED

TRAV-LER MODEL 5021

TRADE NAME	Trav-ler, Model 5021
MANUFACTURER	Trav-ler Radio & Tel. Corp., 571 W. Jackson, Chicago, Ill.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output
RATING	1.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
POWER SUPPLY	240MA @ 1.5 Volts DC and 22MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1750KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	.1 MFD.	"	1400KC	1400KC	"	A5	" " " "
3		Loop	"	Tune for maximum output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TRAV-LER MODEL 5[illegible]

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5	10	150		PRS150/12	BR1215	M-10-150	UT-121	Filter
6	.005	600	PC-6	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
7	.005	600	PC-6	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
8	.01	400	PC-7	484-01	DT4S1	ST-4-01	TC-11	AF Screen Bypass
9	.005	600	PC-6	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.01	400	PC-7	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
11	.01	400	PC-7	484-01	DT4S1	ST-4-01	TC-11	Screen Bypass
12	100	500	MC-2	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
13	100	500	MC-2	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
14	100	500	MC-2	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	1 Meg.	½	VC-8	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

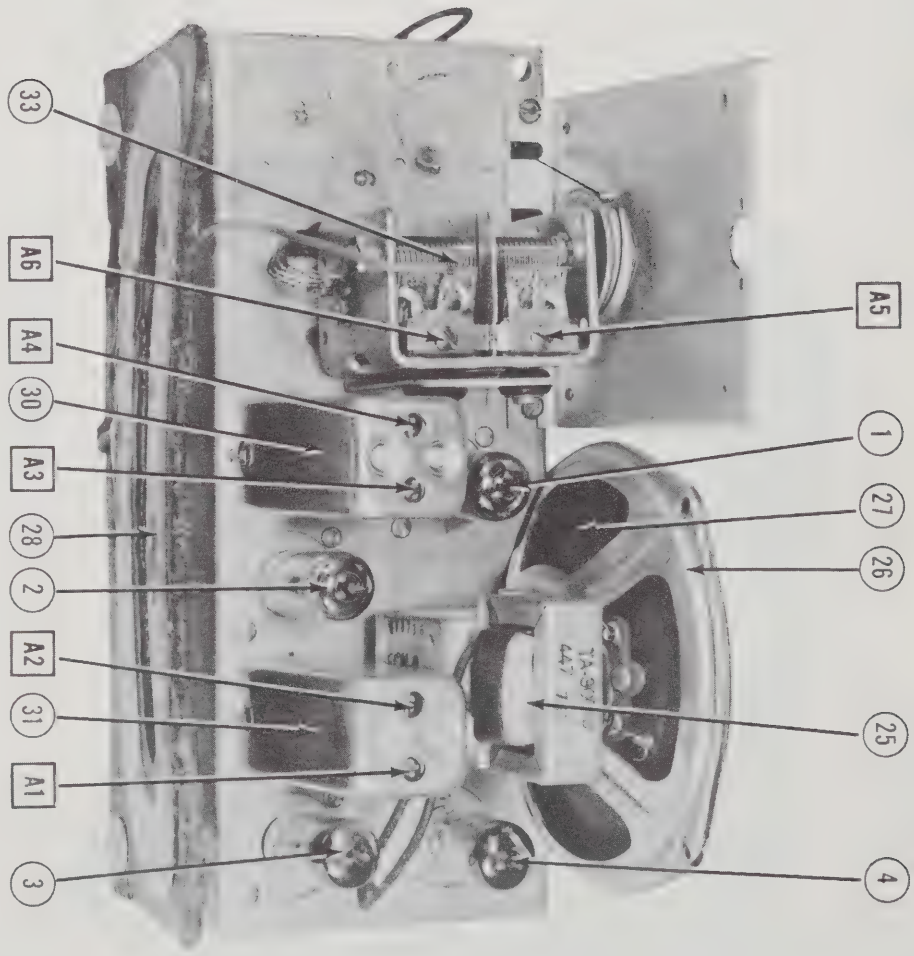
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	IDENTIFICATION CODES
16	220K	½	1R-20	BTS-220K	Red-Red-Yl. Oscillator Grid
17	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
18	10K	½	1R-37	BTS-10K	Br.-Blk.-Or. Screen Dropping
19	82K	½	1R-31	BTS-82K	Gray-Red-Or. Diode RF Filter
20	10 Meg.	½	1R-3	BTS-10 Meg.	Br.-Blk.-blue AF Grid
21	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
22	1 Meg.	½	1R-12	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
23	2.2 Meg.	½	1R-13	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
24	270	½	BW-½-270	BW-½-270	Red-Vi.-Brr. Bias-see Note

Note-Some models use 220Ω in this application. IRC replacement BW-½-220.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25	3700Ω	3.2Ω	410Ω	.72	Part of SPK-8	A-3876#	T22S46#	A-2900#	#Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105		
26	PM	3.2Ω	SPK-8	Mod. P5-X	5A15	
	CONE DIA.	VC DIA.				
27	3-7/16"	1/2"				

R F COILS

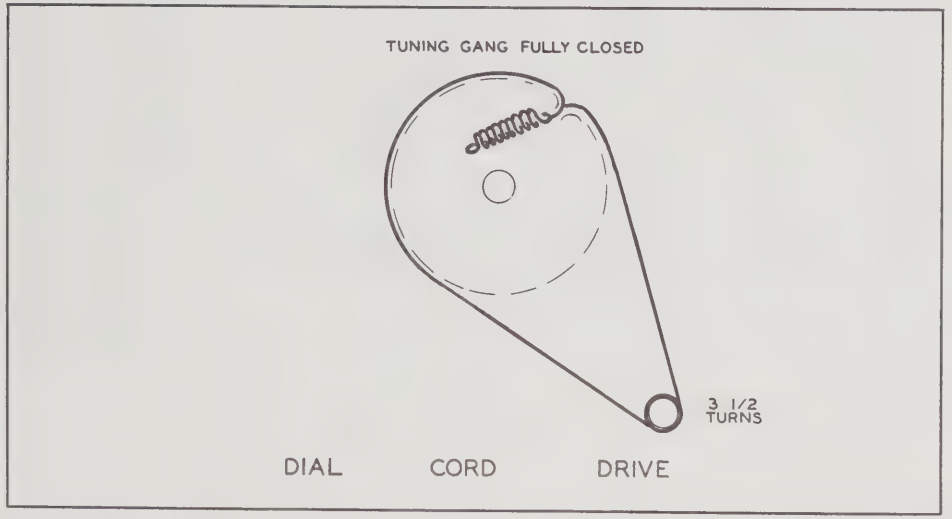
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	
28	Loop Ant.	.1Ω	1.6Ω		14-1060	
29	Osc. Coil	1.2Ω	6.7Ω			
30	Input IF	30.5Ω	30.5Ω			
31	Output IF	24Ω	24Ω			

BATTERIES

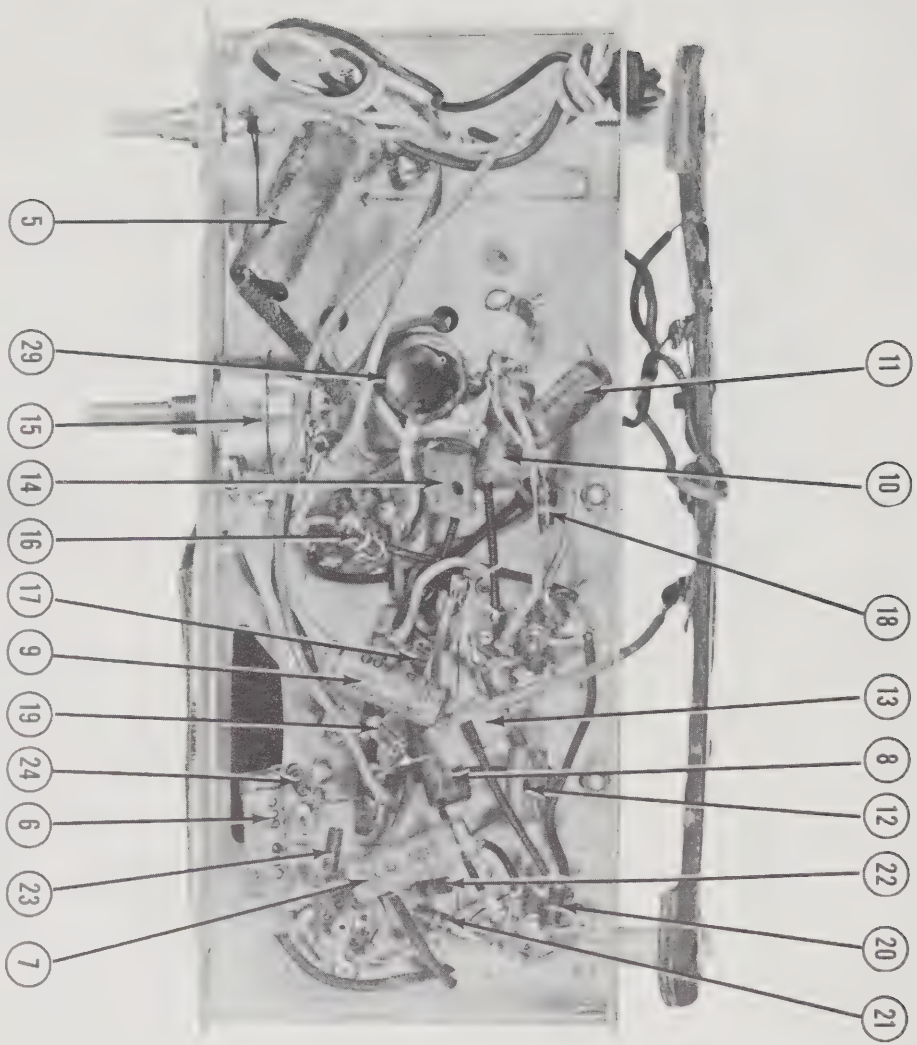
ITEM No.	VOLTAGE	TRAV-LER PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
32	1.5V "A" 90V "B"				#758			17GD60	

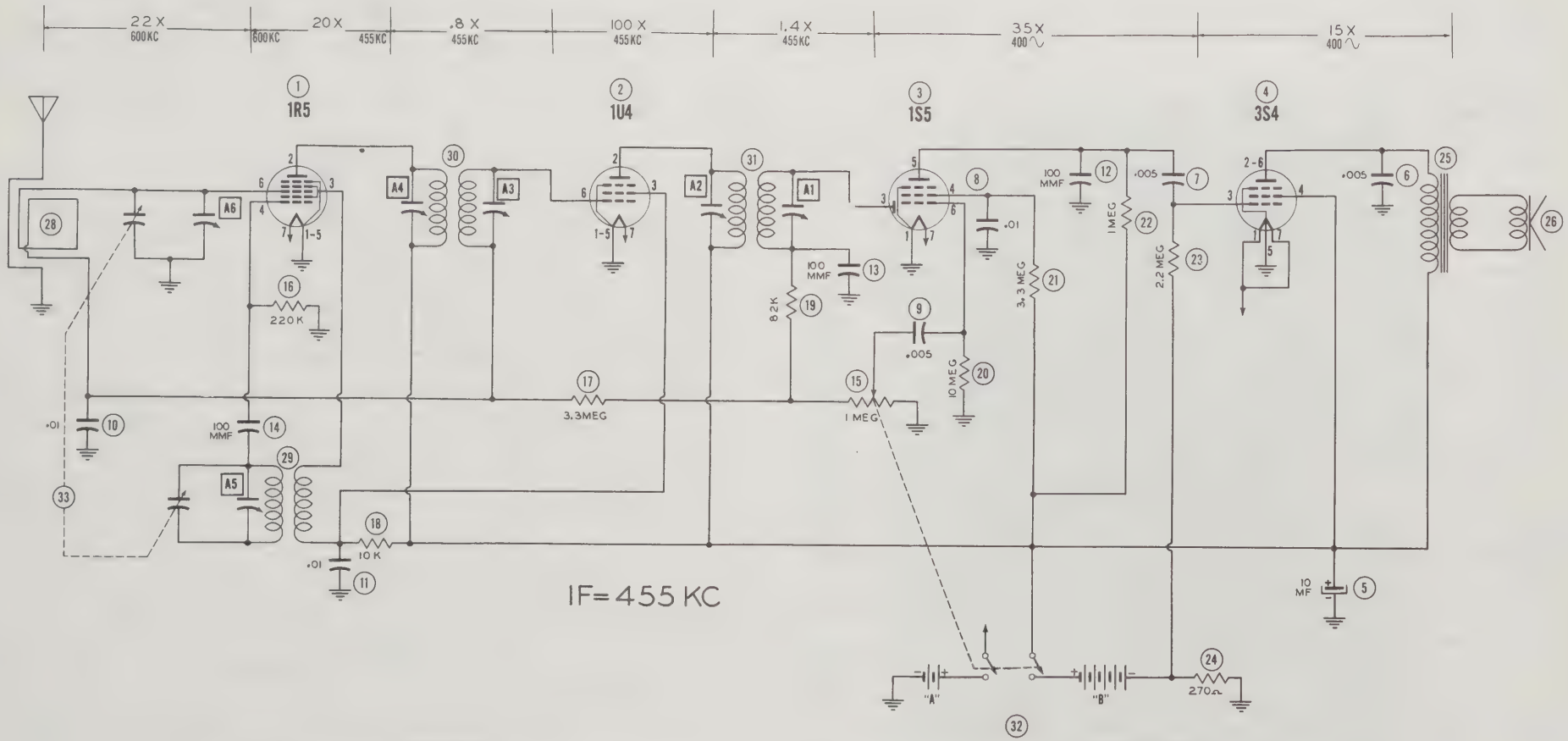
MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
33	2 Gang Var. Cap.	GC-4	(30-470MMF, 30-190MMF)
A6	Trimmer	TC-7	Ant. Adj.



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	[illegible]	55VDC	-12VDC§	0V.	-.1VDC	1.5VDC
2	1U4	0V.	[illegible]	55VDC	-.1VDC	0V.	-.1VDC	1.5VDC
3	1S5	0V.	0V.	-.1VDC	15VDC	13VDC	0V.	1.5VDC
4	3S4	1.5VDC	76VDC	-.7VDC	82VDC	0V.	76VDC	1.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	70KΩ	80KΩ	220KΩ	0Ω	4.3 Meg.	*
2	1U4	0Ω	70KΩ	80KΩ	4.3 Meg.	0Ω	4.3 Meg.	*
3	1S5	0Ω	I.T.	1.1 Meg.	3.3 Meg.	1 Meg.	10 Meg.	*
4	3S4	*	70KΩ	2.2 Meg.	70KΩ	0Ω	70KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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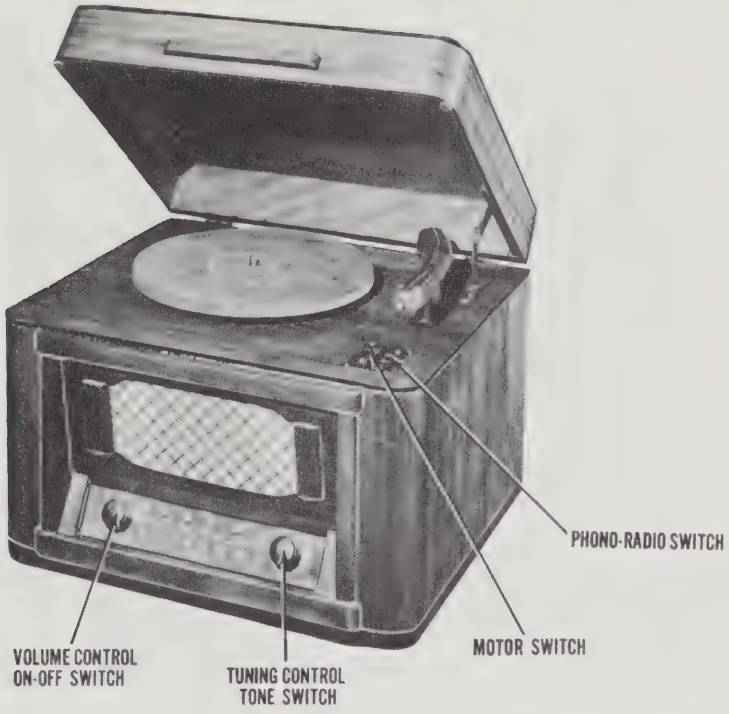
4813-20

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL
D2640



TRUETONE MODEL
D2640

TRUETONE MODEL D2640

TRADE NAME	Truetone, Model D2640
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE--BROADCAST	540-1720KC RATING .27 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1720KC	Tuning cap. fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

DISASSEMBLY INSTRUCTIONS

1. Loosen set screws and remove two control knobs.
2. Remove six snap-in-trimounts holding panel on rear of cabinet. Remove panel from cabinet.
3. Remove phono-pickup plug from chassis.
4. Remove phono-motor plug from chassis.
5. Remove speaker plug from chassis.
6. Remove two screws holding radio-phono switch in cabinet.
7. Remove four hex screws holding chassis in cabinet. Remove chassis from cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	40	150	2072	PRSA50502	BS422150*	DSB-305	TA-440	Filter-Red
B	40	150					"	-Blue
C	25	25					TA-25	Cathode Bypass-Yl.
7	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.01	400		484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
9	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
10	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
11	.002	600		684-002	DT6D2	ST-6-002	TC-22	" "
12	.005	400		484-005	DT6D5	ST-6-005	TC-25	Tone Comp.
13	.005	400		484-005	DT6D5	ST-6-005	TC-25	Phono Tone Comp.
14	.05	400		484-05	DT4S5	ST-4-05	TC-15	RF Decoupling
15	.05	400		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
16	.08	400		484-.1	DT4P1	ST-4-1	72P2	Line Isolation
17	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
18	220	500		1468-0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter
19	47	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
20A	500KΩ	½	2466	D13-133X	T-73	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 20A per instructions
C	Switch		" "	41	SW-A	" " " " "

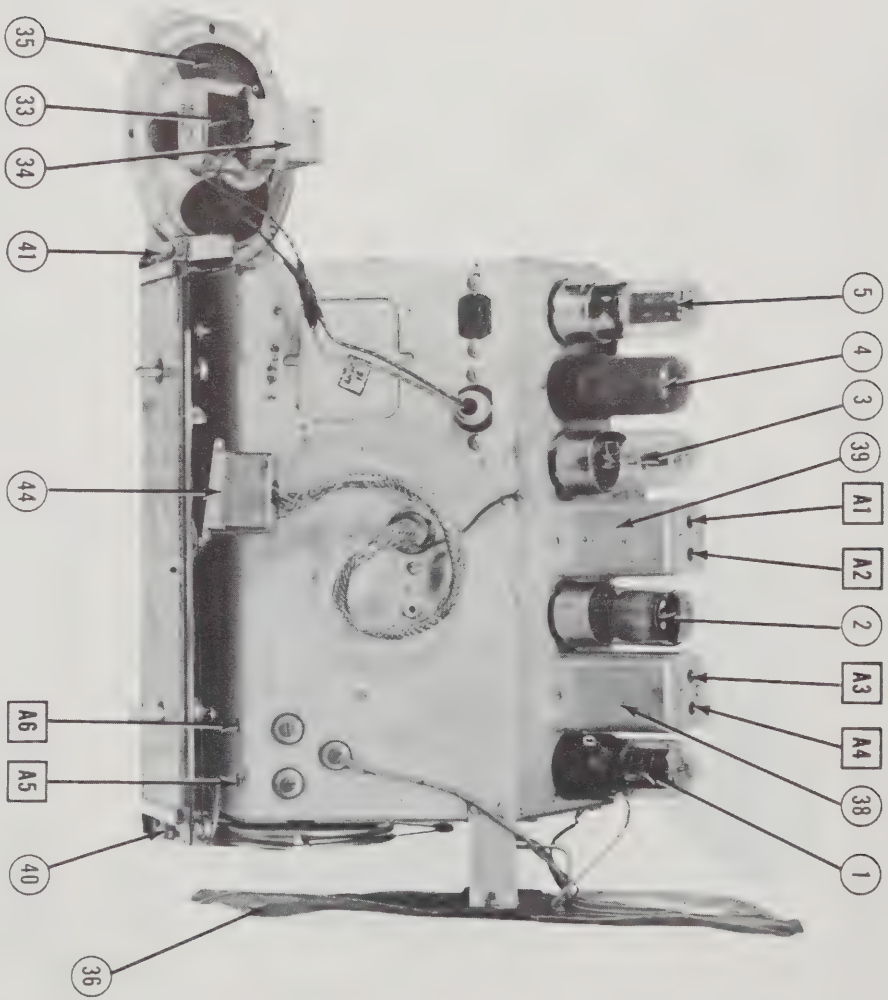
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
21	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
22	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
23	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
24	270KΩ	½		BTS-270K	Red-Vi.-Yl. AF Plate Load
25	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
26	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
27	18Ω	½		BW-½-18	Br.-Gray-Blk. Rectifier Ballast
28	200KΩ	½		BTS-220K	Red-Blk.-Yl. Series Phono
29	75KΩ	½		BTS-68K	Vi.-Grn.-Or. Phono Tone Comp.
30	270KΩ	½		BTS-270K	Red-Vi.-Yl. Line Isolation
31	470Ω	½		BTS-470	Yl.-Vi.-Br. Converter Decoupling

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ~	TRUETONE PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
32	30MA.	310Ω	8 Henries	3368	C-1706‡	T-20C53‡	C-2975‡	‡Drill one new mount mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
33	2500Ω	3.7Ω	150Ω	.5Ω	1335	A-3876†	T22845†	A-2928†	†Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
34	FIELD	VC IMP.	5873	ST-107 Mod. P5-V	5A15	
	PM	3.7Ω				
35	CONE DIA.	VC DIA.				
	4-5/8"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.
36	Loop Ant.	.1Ω	1.3Ω	2814B-A	
37	Osc. Coil	.5Ω	5.7Ω	28165	14-1060
38	Input IF	19.8Ω	19.8Ω	3360	16-5740
39	Output IF	16.2Ω	16.7Ω	3530	16-5742

DIAL LIGHT

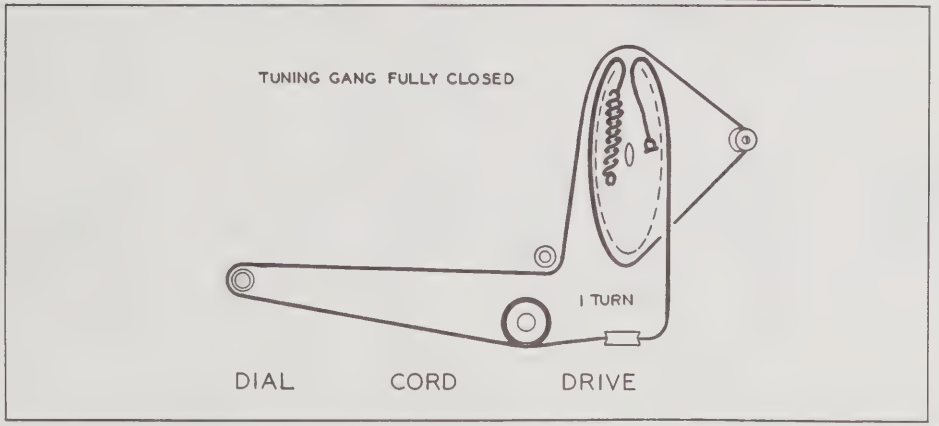
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRUETONE PART No.		
40	Bayonet	6-8	0.15	Brown			Type 47
41	"	"	"	"			" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	TRUETONE PART No.	ASTATIC PART No.	
42		L-70-A	L-70-A Original Part

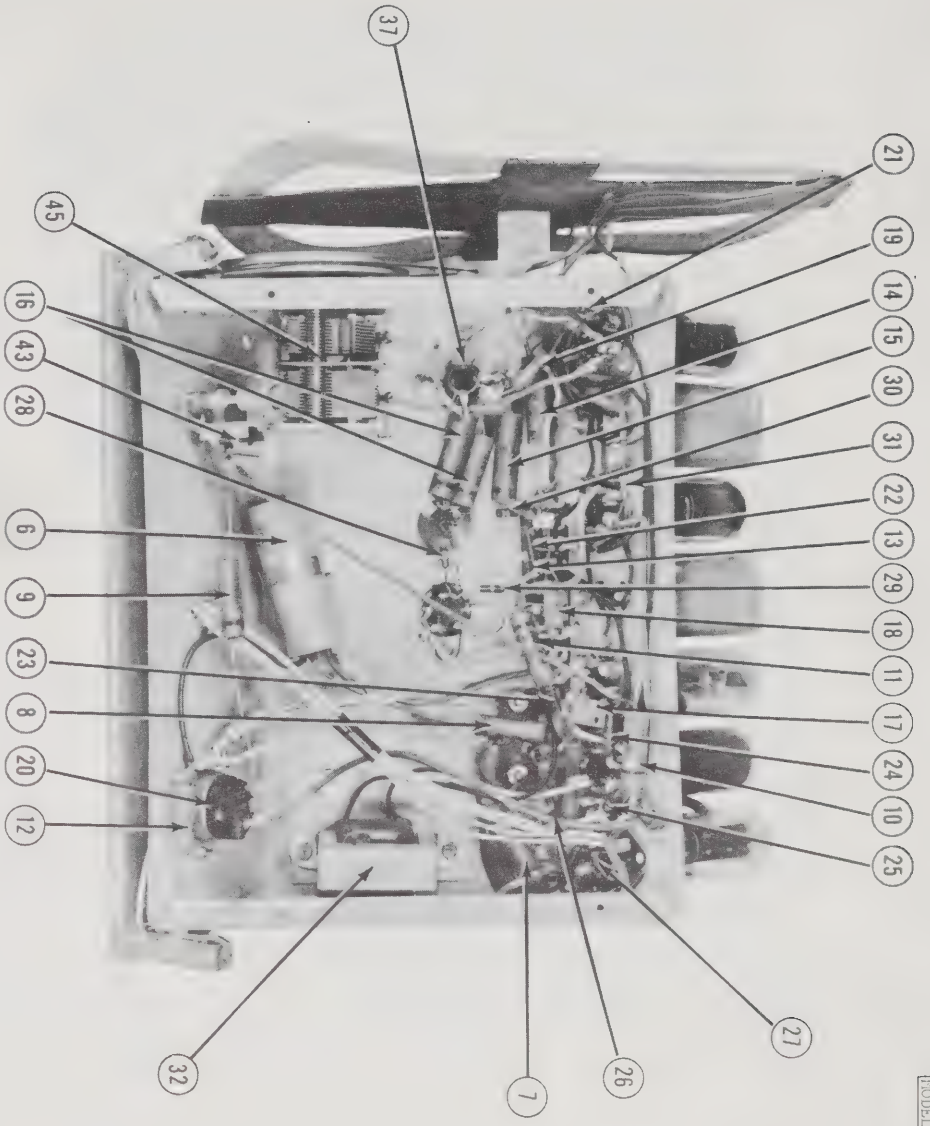
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
43	Switch		Tone
44	"		Radio-Phono
45	2 Gang Var. Cap.	1693	(15-460MMF, 15-180MMF)

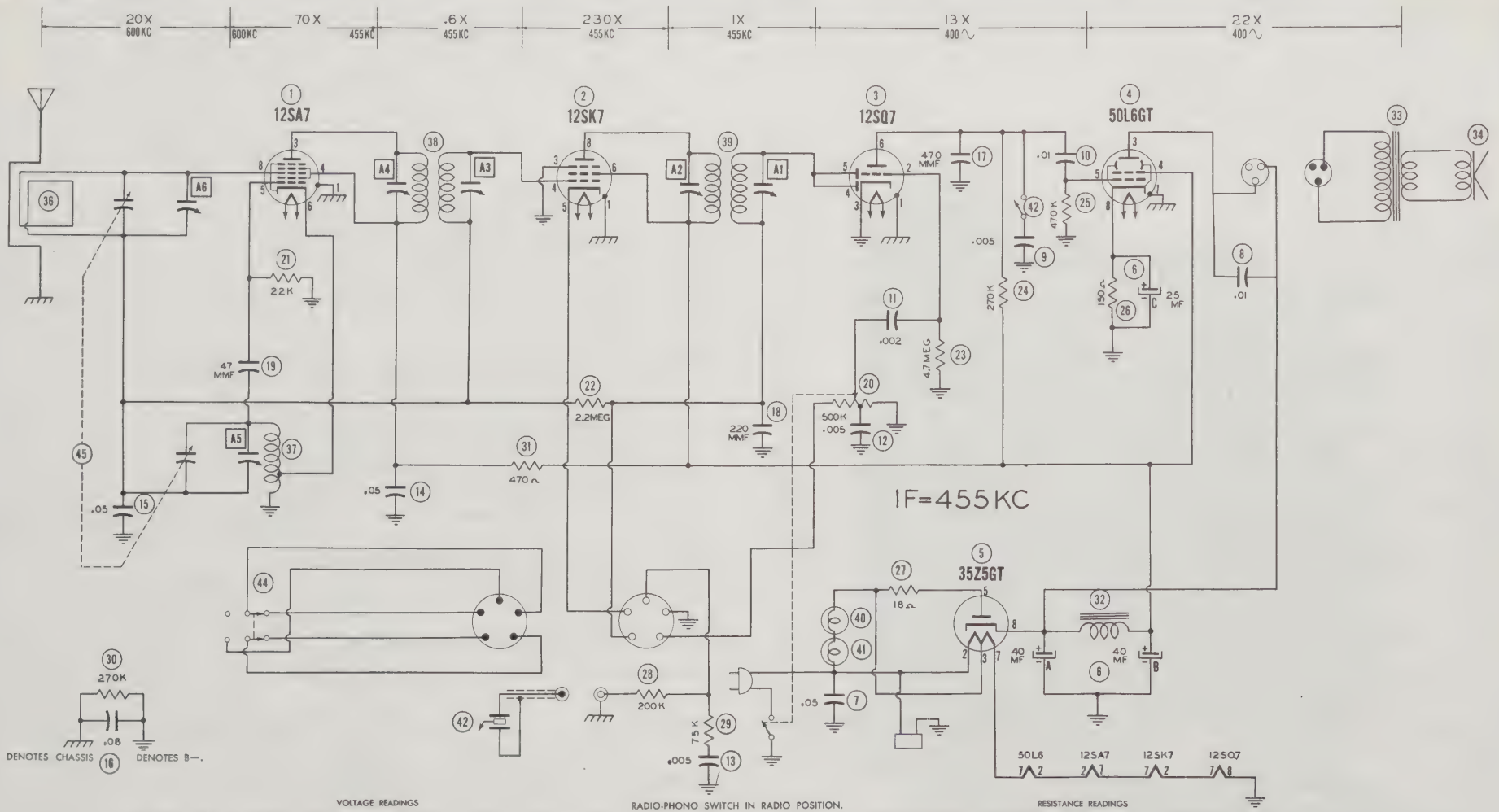


DATE 8/48-#4813-21 SET #43-FOLDER #21

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D2640



VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	37VAC	92VDC	92VDC	-6.8VDC§	0V.	25VAC	-.1VDC
2	12SK7GT	0V.	12VAC	0V.	-.1VDC	0V.	93VDC	25VAC	99VDC
3	12SQ7GT	0V.	-.4VDC	0V.	-.4VDC	-.4VDC	60VDC	12VAC	0V.
4	50L6GT	0V.	37VAC	100VDC	98VDC	0V.	0V.	83VAC	5.8VDC
5	35Z5GT	0V.	117VAC	109VAC	113VAC	106VAC	0V.	83VAC	107VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	270KΩ	38Ω	150KΩ	150KΩ	22KΩ	.5Ω	.5Ω	2.7 Meg.
2	12SK7GT	270KΩ	12Ω	0Ω	2.7 Meg.	0Ω	150KΩ	24Ω	150KΩ
3	12SQ7GT	270KΩ	4.7 Meg.	0Ω	500KΩ	500KΩ	420KΩ	12Ω	0Ω
4	50L6GT	270KΩ	38Ω	150KΩ	150KΩ	470KΩ	0Ω	1.0Ω	150Ω
5	35Z5GT	270KΩ	120Ω	118Ω	119Ω	138Ω	INF.	5MΩ	140KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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4813-21

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D3809
(Fact. #178)

TRUETONE MODEL D3809
(Fact. #178)

TRUETONE MODEL D3809

TRADE NAME	Truetone, Model D3809
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output.
POWER SUPPLY	1.5 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	245MA @ 1.5 Volts DC and 8.6MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2		Loop	1700KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 8/48-#4813-22 SET #43-FOLDER #22

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	16	100	CE-14	PRS150-16	BR1615	M-16-150	UT-161	Battery Bypass
6	.005	600	CP-502-1	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
7	.002	600	CP-202-2	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
8	.01	200	CP-103-3	484-01	DT2S1	ST-4-01	TC-11	AF Screen Bypass
9	.001	600	CP-102-3	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
10	.01	200	CP-103-3	484-01	DT2S1	ST-4-01	TC-11	Conv. Decoupling
11	.05	200	CP-503-4	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
12	100	500	CM-101-2	1468-0001	5W5T1	MO.5-31	1FM-3	AF Plate Bypass-Cer.
13	100	500	CM-101-2	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
14	1 Meg.	½	VC-6			Volume Control & Sw.

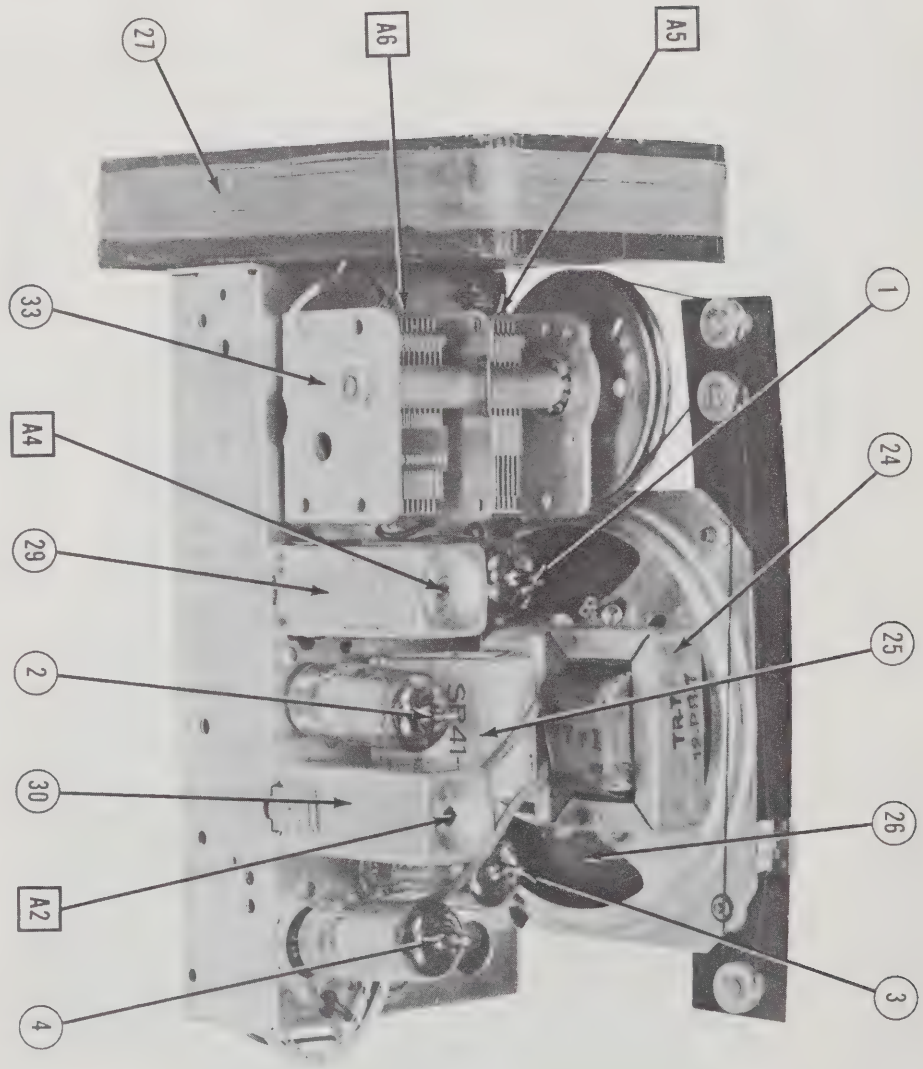
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
15	100KΩ	½	RC-104-1	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
16	15KΩ	½	RC-153-1	BTS-15K	Br.-Grn.-Or. Converter Decoupling
17	3.3 Meg.	½	RC-335-1	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
18	2.2 Meg.	½	RC-225-1	BTS-2.2 Meg.	Red-Red-Grn. 1st IF Transformer Shunt
19	10 Meg.	½	RC-106-1	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
20	3.3 Meg.	½	RC-335-1	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
21	1 Meg.	½	RC-105-1	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
22	2.2 Meg.	½	RC-225-1	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
23	820Ω	½	RC-821-2	BTS-820	Gray-Red-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
24	7000Ω	3.6Ω	360Ω	.6Ω	TR-7	A-3878*	T22847*	A-2931*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				†Drill new mounting holes and trim flange.
25	PM	3.6Ω	SP-41-7		4A1†	
	CONE DIA.	VC DIA.				
26	4"	1/2"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT			

R F COILS

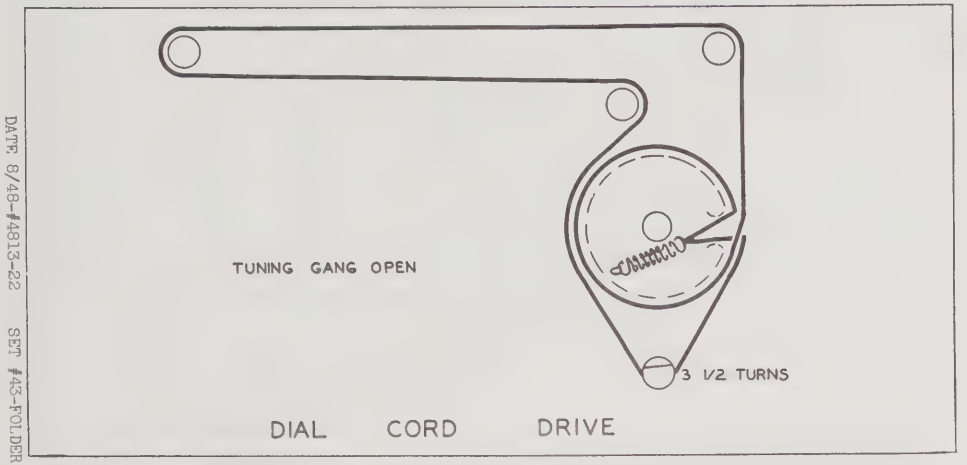
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
27	Loop Ant.		.3Ω	LP6		
28	Osc. Coil	2.5Ω	6.5Ω	LC4	14-1040‡	‡Add 50 MMFD from osc. grid to high side tuning cap.
29	Input IF	38Ω	33Ω	LF22	16-6678	
30	Output IF	38Ω	33Ω	LF22	16-6678	

BATTERIES

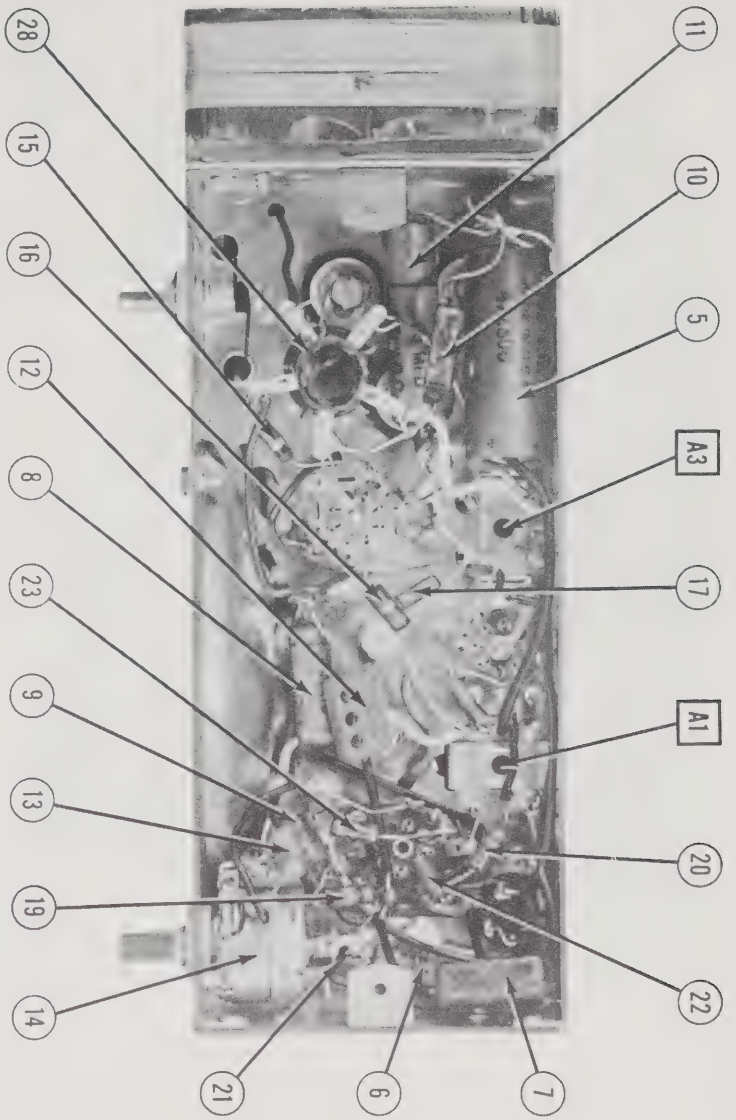
ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
31	1.5V "A"		#950			#2R			3 Used in Parallel
32	67.5V"B"			#467			#XX-45		

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
33	2 Gang Var. Cap.	CV10	(27-475MMF, 18-164MMF)
	Dial Pointer	PN6	



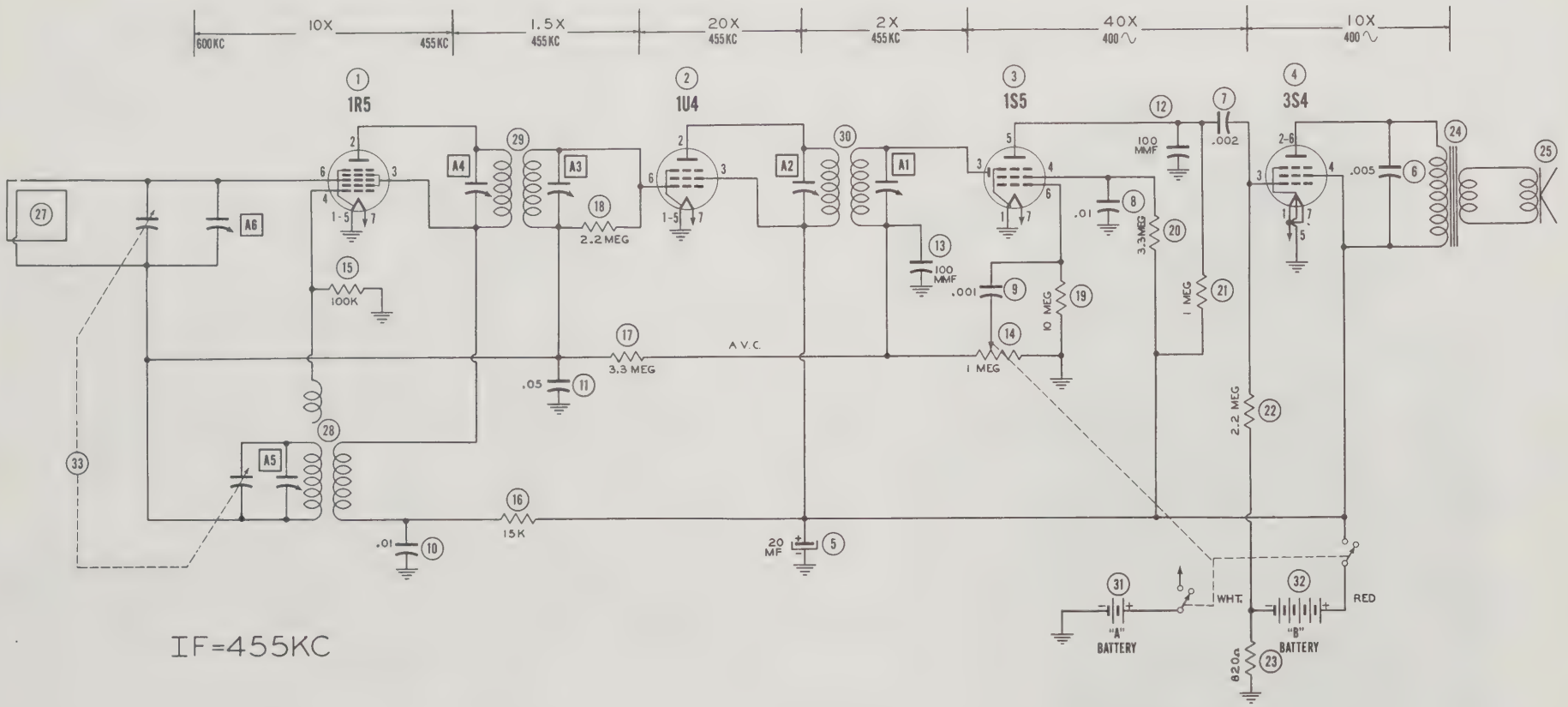
CHASSIS—BOTTOM VIEW



DATE 8/48-#4813-22 SET #43-FOLDER #22

TRUETONE MODEL D2809

TRUETONE MODEL D2809



IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	32VDC	32VDC	-11VDC§	0V.	0V.	1.4VDC
2	1U4	0V.	62VDC	62VDC	0V.	0V.	0V.	1.4VDC
3	1S5	0V.	-7VDC	0V.	11VDC	9VDC	0V.	1.4VDC
4	3S4	1.4VDC	59VDC	-1VDC	62VDC	0V.	58VDC	1.4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	1 Meg.	1 Meg.	100KΩ	*	5 Meg.	*
2	1U4	*	1 Meg.	1 Meg.	INF.	*	5 Meg.	*
3	1S5	*	750Ω	1 Meg.	4.3 Meg.	2 Meg.	10 Meg.	*
4	3S4	*	1 Meg.	2.2 Meg.	1 Meg.	*	1 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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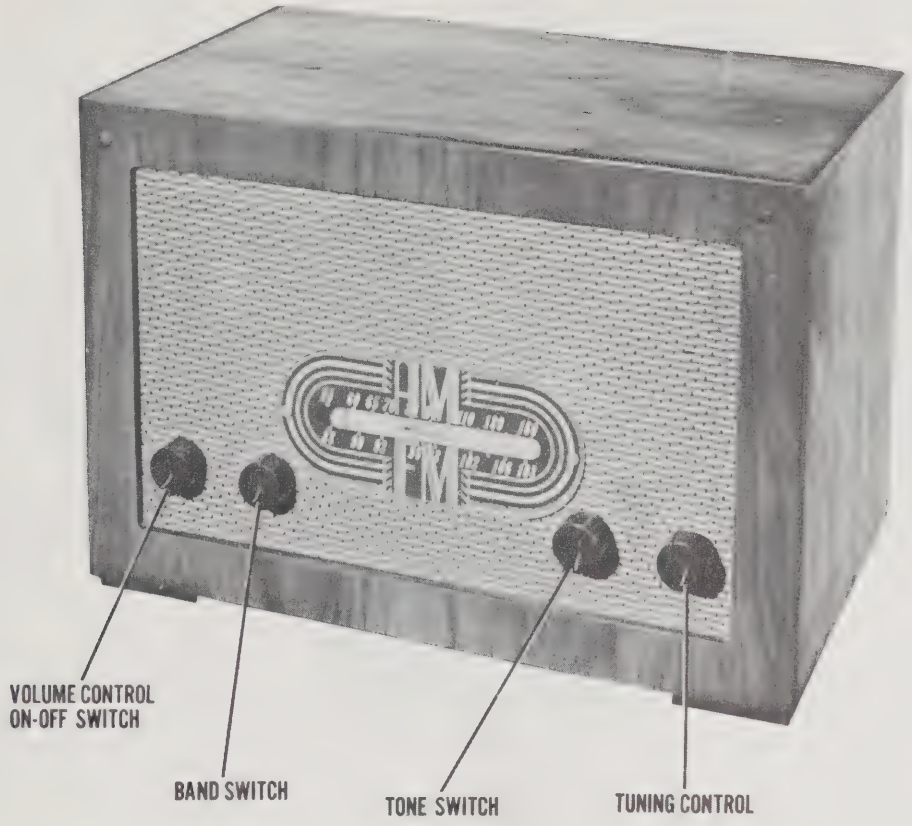
4813-22

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC line to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements

WATTERSON MODEL
4800



WATTERSON MODEL
4800

WATTERSON MODEL 4800

TRADE NAME	Watterson, Model 4800
MANUFACTURER	Watterson Radio Mfg. Co., 2700 Swiss Ave., Dallas, Texas
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12AT7 FM Converter, 12SA7 AM Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — FM 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (counter-clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	1620KC	"	"	"	A5	Adjust for maximum output
3	200MMFD	"	1400KC	"	Tune for maximum output	"	A6	" " " "
4		Place sig. gen. output lead near receiver. (No direct connection)	21.75MC (400 ∿ AM)	FM (clockwise)	Tuning cap. fully open.	"	A7	" " " "
5		"	108MC (400 ∿ AM)	"	"	"	A8	" " " "
6		"	105MC (400 ∿ AM)	"	Tune for maximum output.	"	AC	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

WATTERSON MODEL 4800

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		WATTERSON PART No.	STANDARD REPLACEMENT		
1	FM Converter	12AT7	12AT7		
2	AM Converter	12SA7	12SA7	8R	
3	IF Amp.	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AJ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	WATTERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7A	80	150		AF686D4A*	*UP443150	DY-415*	EL-443*	● Filter
B	40	150		PRS150/40	BR4015	M-30-150	UT-401	■ "
C	30	150						▲ "
D	30	25						Cathode Bypass
8	10	50		PRS50/10	BR105	M-10-50	TA-510	Stabilizing Cap.
9	.01	600		684-01	DT6S1	ST-6-01	TC-11	Line Filter
10	.003	600		684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
11	.003	600		684-003	DT6D3	ST-6-003	TC-23	Tone Comp.
12	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
13	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
14	.05	400		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
15	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
16	.001	600		684-001	DT6D1	ST-6-001	TC-21	De-emphasis
17	.001	600		684-001	DT6D1	ST-6-001	TC-21	Ext. Ant. Coupling
18	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling
19	100	300		1468-0001	5W5T1	MO.5-31	1FM-31	Filament Bypass-Cer.
20	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Rectifier Bypass
21	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
22	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
23	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
24	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback-Cer.
25	20	300		1468-000025	5W5Q2	MOS.5-42	MS-42	Osc. Grid Cap.-Cer.
26	50	300		1469-00005	5R5Q5	MOS.5-45	MS-45	Fixed Padder-Cer.
27	2	300						Osc. Coupling-Cer.
28	5000	300		1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass
29	30	300			5W5Q3	MO.5-43	MS-43	Regenerative Feedback-Cer.
30	30	300			5W5Q3	MO.5-43	MS-43	" " "
31	2500	300		1467-0025	1W5D25	MW.5-225	1FM-225	Quench Network
32	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass-Cer.
33	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling-Cer.
34	2	300						FM Ant. Coupling-Cer.

*Parallel sections to obtain desired capacity.

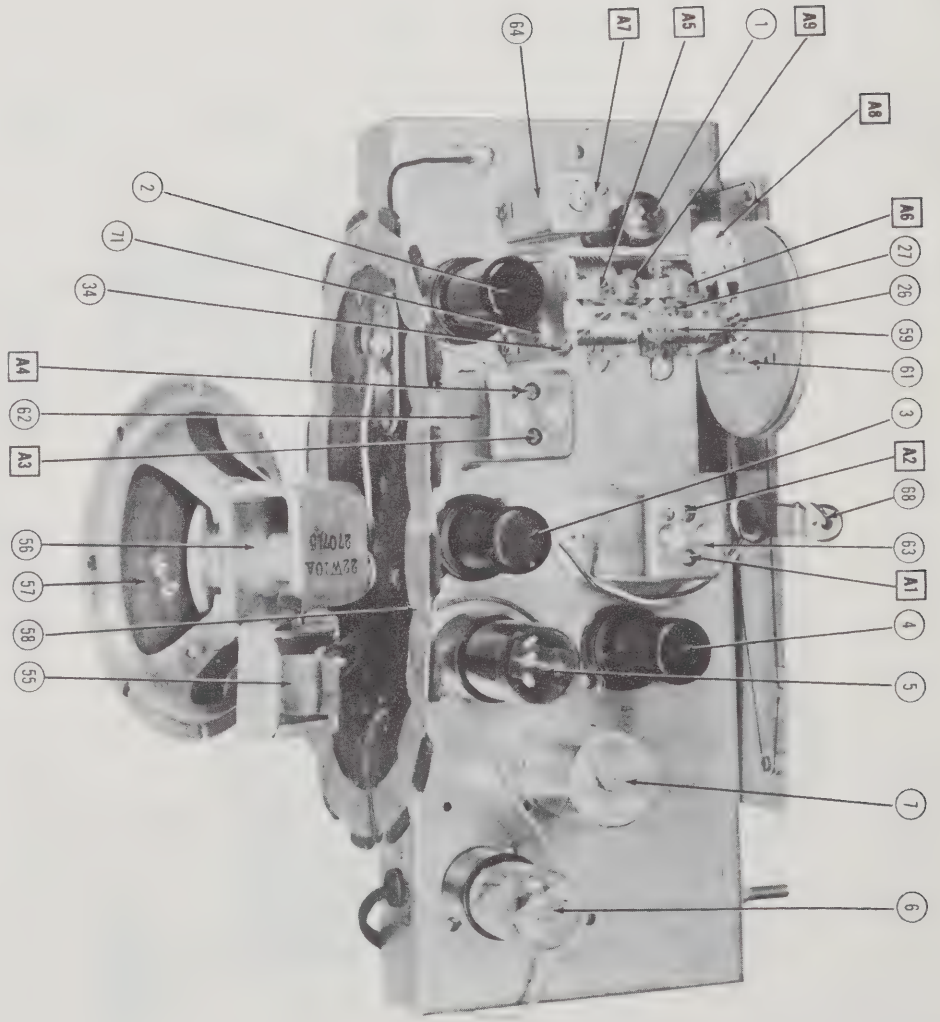
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	WATTERSON PART No.	IRC PART No.	CLAROSTAT PART No.	
35A	500KΩ	½	13W1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 35A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WATTERSON PART No.	IRC PART No.	
36	25KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
37	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
38	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
39	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
40	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
41	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
42	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
43	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
44	100Ω	½			Br.-Blk.-Br. FM Osc. Decoupling
45	24Ω	½			Red-Yl.-Blk. Parasitic Suppressor
46	22KΩ	½		BTS-22K	Red-Red-Or. Conv. Cathode

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

47	100KΩ	±		BTS-100K	Br.-Blk.-Yl. De-emphasis
48	1500Ω	±		BTS-1500	Br.-Grn.-Red Quench Network
49	150KΩ	±		BTS-150K	Br.-Grn.-Yl. Voltage Dropping
50	15KΩ	±		BTS-15K	Br.-Grn.-Or. FM IF Transformer Shunt
51	1000Ω	±		BTS-1000	Br.-Blk.-Red Filter
52	1000Ω	±		BTS-1000	Br.-Blk.-Red "
53	22Ω	±		BW-½-22	Red-Red-Blk. Surge Limiter
54	56KΩ	±		BTS-56K	Grn.-Blue-Blk. Tone Comp.

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA WATTERSON PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
55	2000Ω	3.05Ω	186Ω	.8Ω	12W1	A-3876†	T22S45†	A-2928†	†Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA WATTERSON PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-106		
56	PM	3.05Ω	22W10	Mod. P5-W	5A15	
	CONE DIA.	VC DIA.				
57	4-3/4"	5/8"				

R F COILS

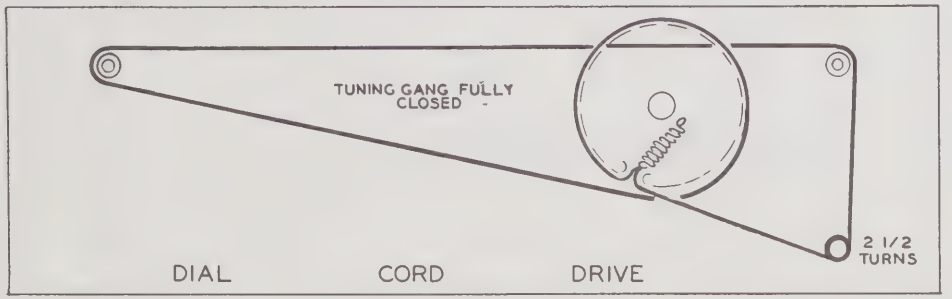
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA WATTERSON PART No.	REPLACEMENT DATA MEISSNER PART No.	
58	Loop Ant.	.1Ω	1.2Ω			
59	FM RF Coil		0Ω			
60	BC Osc. "	.6Ω	6.8Ω		14-1060	Add 50MTFD from high side of tuning cap. to osc. grid.
61	FM " "		0Ω			
62	AM Input IF	20.2Ω	20.2Ω		16-6658	
63	AM Output IF	30.2Ω	30.2Ω		16-6660	
64	FM " "	.4Ω	3Ω			
65	RF Choke		1.8Ω			
66	" "		1.8Ω			
67A	Line RF Chk	0Ω	0Ω			
B	" " "	0Ω	0Ω			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA WATTERSON PART No.		INSTALLATION NOTES
68	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	WATTERSON PART No.	NOTES
69	Switch		Band
70	"		Tone
71	Tuning Gang		(35-530 MMF, 30-205 MMF)



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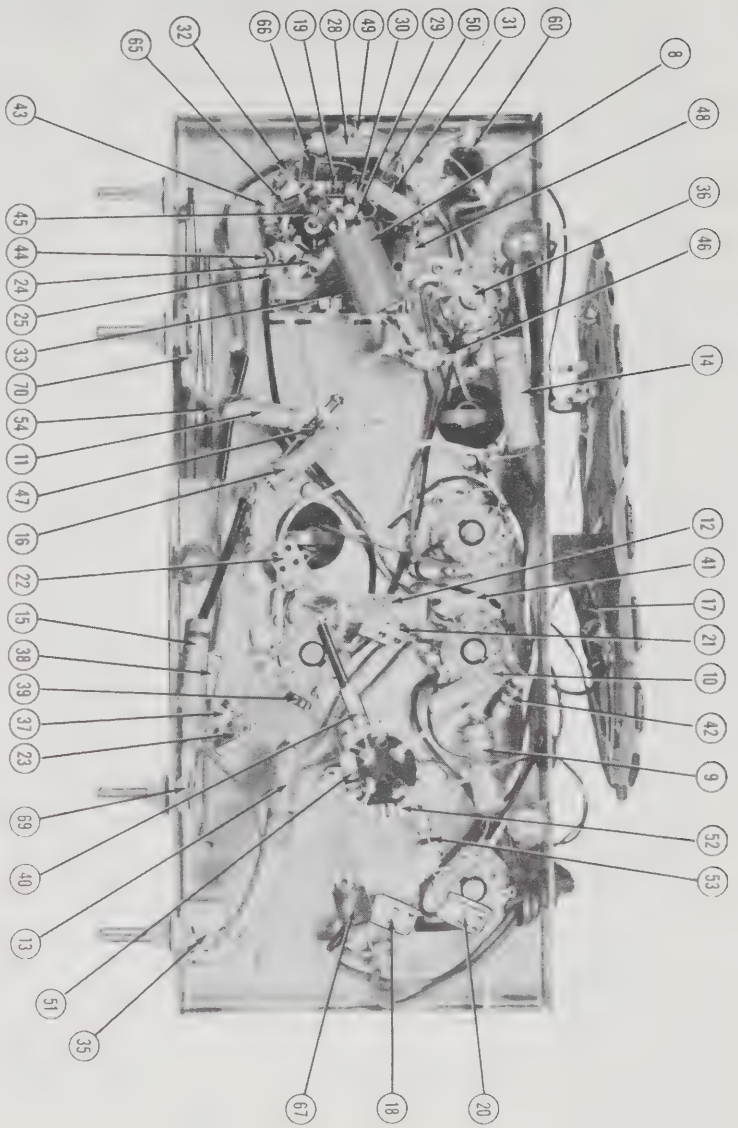
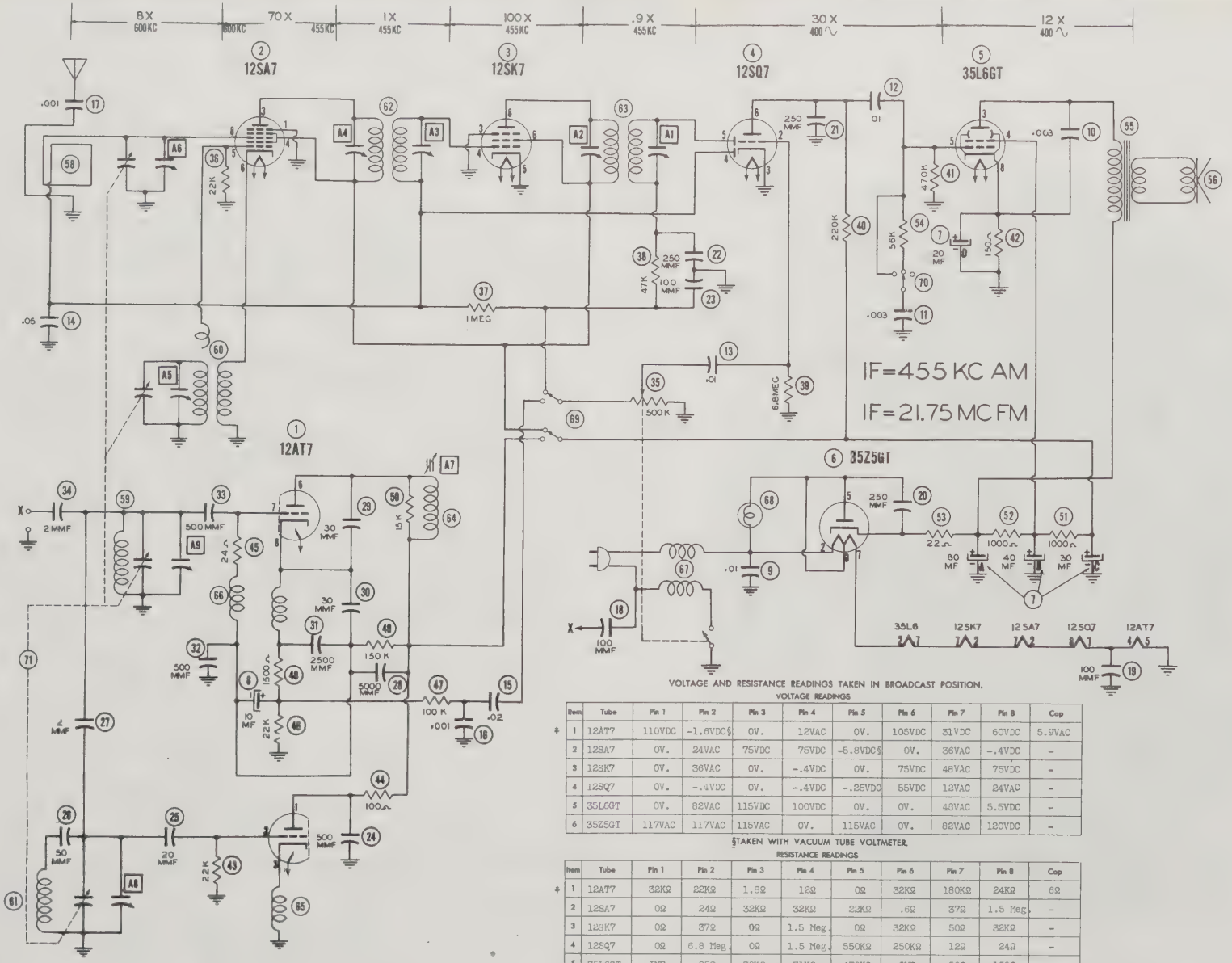
WATTERSON MODEL 480C

CHASSIS—BOTTOM VIEW



WATTERSON MODEL 480C



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	12AT7	110VDC	-1.6VDC§	0V.	12VAC	0V.	105VDC	31VDC	60VDC	5.9VAC
2	12SA7	0V.	24VAC	75VDC	75VDC	-5.8VDC§	0V.	36VAC	-.4VDC	-
3	12SK7	0V.	36VAC	0V.	-.4VDC	0V.	75VDC	48VAC	75VDC	-
4	12SQ7	0V.	-.4VDC	0V.	-.4VDC	-.25VDC	55VDC	12VAC	24VAC	-
5	35L6GT	0V.	82VAC	115VDC	100VDC	0V.	0V.	43VAC	5.5VDC	-
6	35Z5GT	117VAC	117VAC	115VAC	0V.	115VAC	0V.	82VAC	120VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

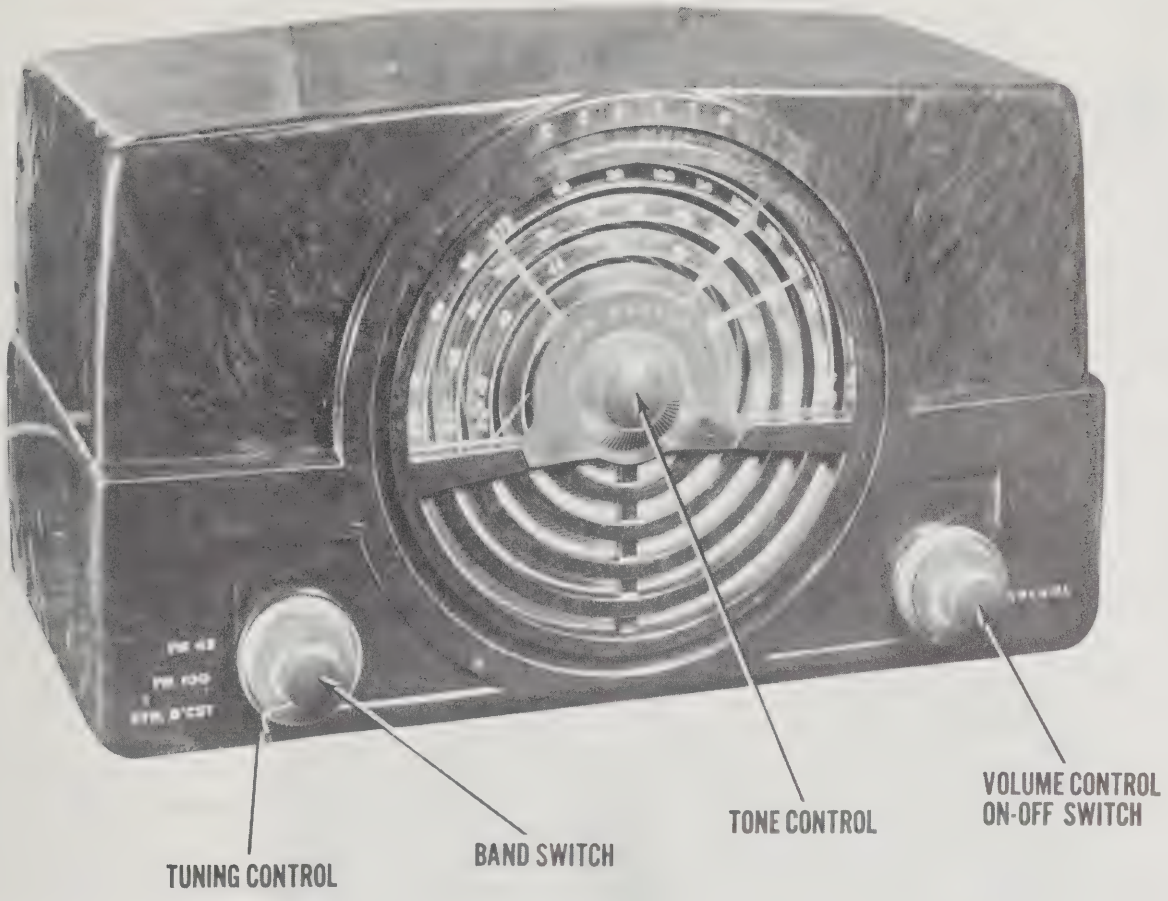
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	12AT7	32KΩ	22KΩ	1.8Ω	12Ω	0Ω	32KΩ	180KΩ	24KΩ	6Ω
2	12SA7	0Ω	24Ω	32KΩ	32KΩ	22KΩ	.6Ω	37Ω	1.5 Meg.	-
3	12SK7	0Ω	37Ω	0Ω	1.5 Meg.	0Ω	32KΩ	50Ω	32KΩ	-
4	12SQ7	0Ω	6.8 Meg.	0Ω	1.5 Meg.	550KΩ	250KΩ	12Ω	24Ω	-
5	35L6GT	INF.	85Ω	30KΩ	31KΩ	470KΩ	INF.	50Ω	150Ω	-
6	35Z5GT	115Ω	115Ω	110Ω	INF.	110Ω	INF.	85Ω	30KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ZENITH MODEL 7H820,
7H820W (Ch. 7E01)



ZENITH MODEL 7H820,
7H820W (Ch. 7E01)

ZENITH MODEL 7H820

TRADE NAME	Zenith, Model 7H820, 7H820W (Ch. 7E01)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.
TYPE SET	AC-DC Operated AM - 2 Band FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 12BA6 RF Amp., 12BE6 Converter, 12BA6 1st IF Amp., 12BA6 2nd IF Amp., 12AU6 Limiter, 19T8 Disc.-Det.-AVC-AF, 35B5 Power Output.
POWER SUPPLY	110-120 Volts AC-DC RATING .42 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC FREQ. MOD. 42-48.5MC, 88-108MC

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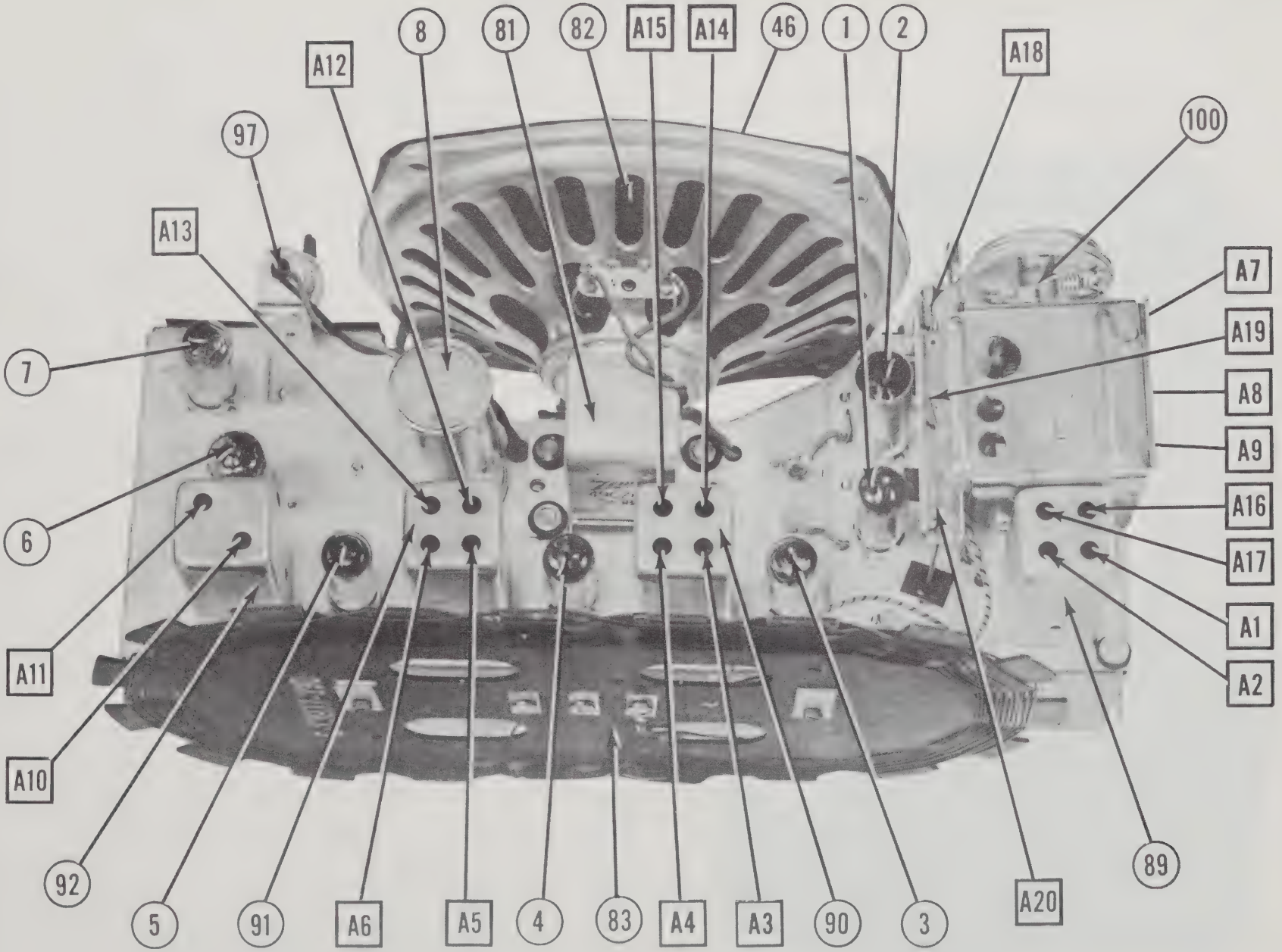
DATE 8/48-#4813-24 SET #4813-24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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12BA6	12BA6	7BK	
2	Converter	12BE6	12BE6	7CH	
3	1st IF Amp.	12BA6	12BA6	7BK	
4	2nd IF Amp.	12BA6	12BA6	7BK	
5	Limiter	12AU6	12AU6	7BK	
6	Disc.-Det.-AVC-AF	19T8	19T8		
7	Power Output	35B5	35B5	7BZ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	80	150	22-1661	AF886D4A*	UP44315C*	DY-410*	EL-443*	◓ Filter
B	40	150		PRS150/50	BR5015	M-40-150	UT-501	▲ "
C	40	150						■ "
D	40	20						Cathode Bypass
9	.05	400	22-1017	484-05	DT4S5	ST-4-05	TC-15	Line Filter
10	.005	1200	22-1702	1684-005	MD16D5	STM-16-05	TC-25	Tone Compensation
11	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	AF Plate Decoupling
12	.02	600	22-830	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
13	.02	400	22-1683	484-02	DT4S2	ST-4-02	TC-12	" "
14	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	Volume Cont. Isolation
15	.1	200	22-1418	484-.1	DT2P1	ST-2-1	TC-1	Tone Compensation
16	.1	200	22-1418	484-.1	DT2P1	ST-2-1	TC-1	" "
17	.01	200	22-1385	484-01	DT2S1	ST-4-01	TC-11	Audio Coupling
18	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	Limiter Plate Decoup.
19	.01	200	22-1385	484-01	DT2S1	ST-2-01	TC-11	Limiter Screen Bypass
20	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	2nd IF Bypass
21	.01	200	22-1385	484-01	DT2S1	ST-4-01	TC-11	2nd IF Cathode Bypass
22	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	1st IF Decoupling
23	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
24	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	" "
25	.01	200	22-1385	484-01	DT2S1	ST-4-01	TC-11	Filament Bypass
26	.01	200	22-1385	484-01	DT2S1	ST-4-01	TC-11	" "
27	100	300	22-162	1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling-Cer.
28	1000	300	22-1676	1468-001	1W5D1	MO.3-21	1FM-21	Filament Bypass-Cer.
29	1000	300	22-1676	1468-001	1W5D1	MO.3-21	1FM-21	" " "
30	500	300	22-1138	1468-0005	5W5T5	MO.5-35	1FM-35	Tone Compensation-Cer.
31	25	300	22-1507	1468-000025	5W5Q25	MO.5-425	MS-425	Limiter Grid Filter-Cer.
32	100	300	22-365	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
33	55	300	22-1691					Fixed Trimmer-Cer.
34	5000	500	22-1706	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Plate Decoup.-Cer.
35	50	300	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
36	5000	500	22-1706	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Screen Byp.-Cer.
37	48	300	22-1689	1469-00005	5R5Q5	MOS.5-45	MS-45	Fixed Trimmer-Cer.
38	100	300	22-162	1468-0001	5W5T1	MO.5-31	1FM-31	RF Plate Decoup.-Cer.
39	19	300	22-1688					Fixed Trimmer-Cer.
40	100	300	22-1669	1468-0001	5W5T1	MO.5-31	1FM-31	RF Plate Decoupling-Cer.
41	30	300	22-1705	1468-000044	5W5Q3	MO.5-43	MS-43	RF Cathode Bypass-Cer.
42	1000	300	22-1676	1468-001	1W5D1	MO.3-21	1FM-21	RF Screen Bypass-Cer.
43	22	300	22-1506					Fixed Trimmer-Cer.
44	5000	500	22-1706	1467-005	1D5D5	MW.5-25	1FM-25	Ext. Ant. Isolation-Cer.

*Parallel sections to obtain desired capacity.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: ZENITH PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
81	FIELD / PM	VC IMP. / 3.6Ω	40-608	ST-1171† Mod. P8-T	8A21†	†Drill and tap magnet frame.
82	CONE DIA.	VC DIA.				
	7-3/8"	3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	
83	Loop Ant.	.1Ω	1Ω	S-13977		
84	FM Ant.Coil	0Ω	0Ω	S-14162		
85	BC RF Coil	2.5Ω	10Ω	S-13974		
86	FM " "	0Ω	0Ω	S-13971		
87	BC Osc.Coil		9.8Ω	S-11157		
88	FM " "		0Ω	S-12259		
89A	1st IF AM	7.2Ω‡	8Ω#	S-13970		‡Includes both primaries
B	" " FM					
90A	2nd IF AM	8.2Ω‡	2.2Ω#	S-13971		#Includes both secondaries
B	" " FM					
91A	3rd IF AM	8.5Ω‡	7.5Ω	S-13972		
B	" " FM		.8Ω			
92	FM Disc.	.4Ω	.4Ω	S-13973		
93	RF Choke Coil		.8Ω	S-13997		
94	Fil. Choke Coil		.8Ω	S-13997		
95	"		.2Ω	S-14126		
96	Line Choke Coil		.1Ω	S-12256		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: ZENITH PART No.		INSTALLATION NOTES
97	Bayonet	115			100-57		Type 3-7

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
98	Switch	S-14168	Band
99	Rectifier	212-3	Selenium (212-4 Alternate)
100	Tuning Gang	22-1677	(24-410MMF, 16-213MMF, 18-92MMF)
A21	Trimmer	22-1686	FM Osc. Adj.
A22	"	22-1685	FM RF Adj.
A23	"	22-1685	FM Ant. Adj.
	Louvre Dial	26-365	
	Plastic Cabinet	14-648	Model 7H820W
	Bakelite Cabinet	14-1020	Model 7H520

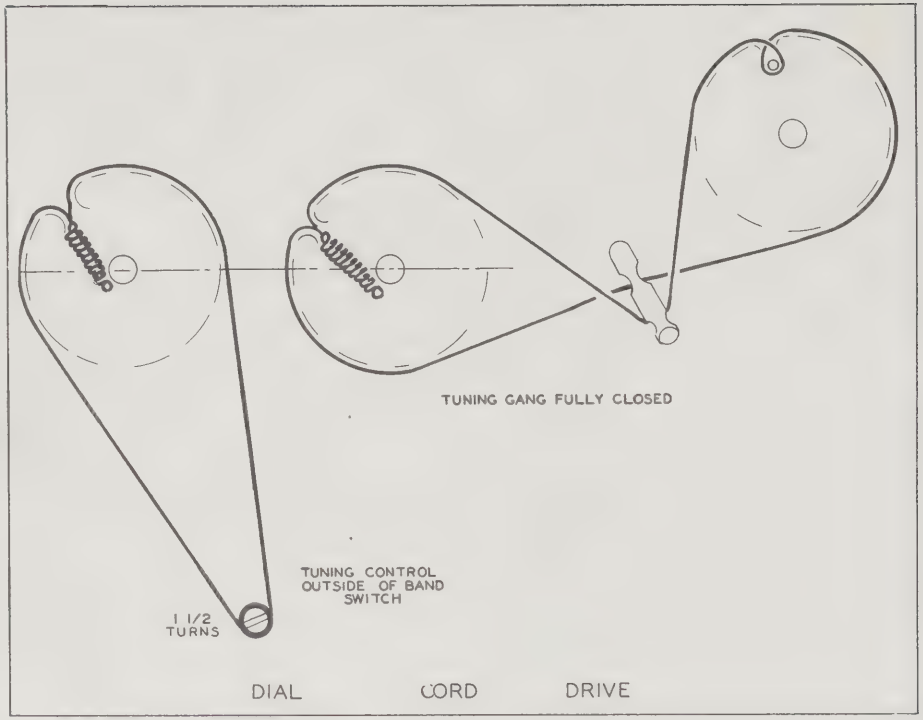
PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	
45A	2.5 Meg.	½	63-1584	D13-139	AM-66-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 45A per instructions
C	Switch		" "	41	SW-A	" " " " "
46A	50KΩ	½	63-1582	D11-123	AM-44-S	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 46A per instructions

RESISTORS

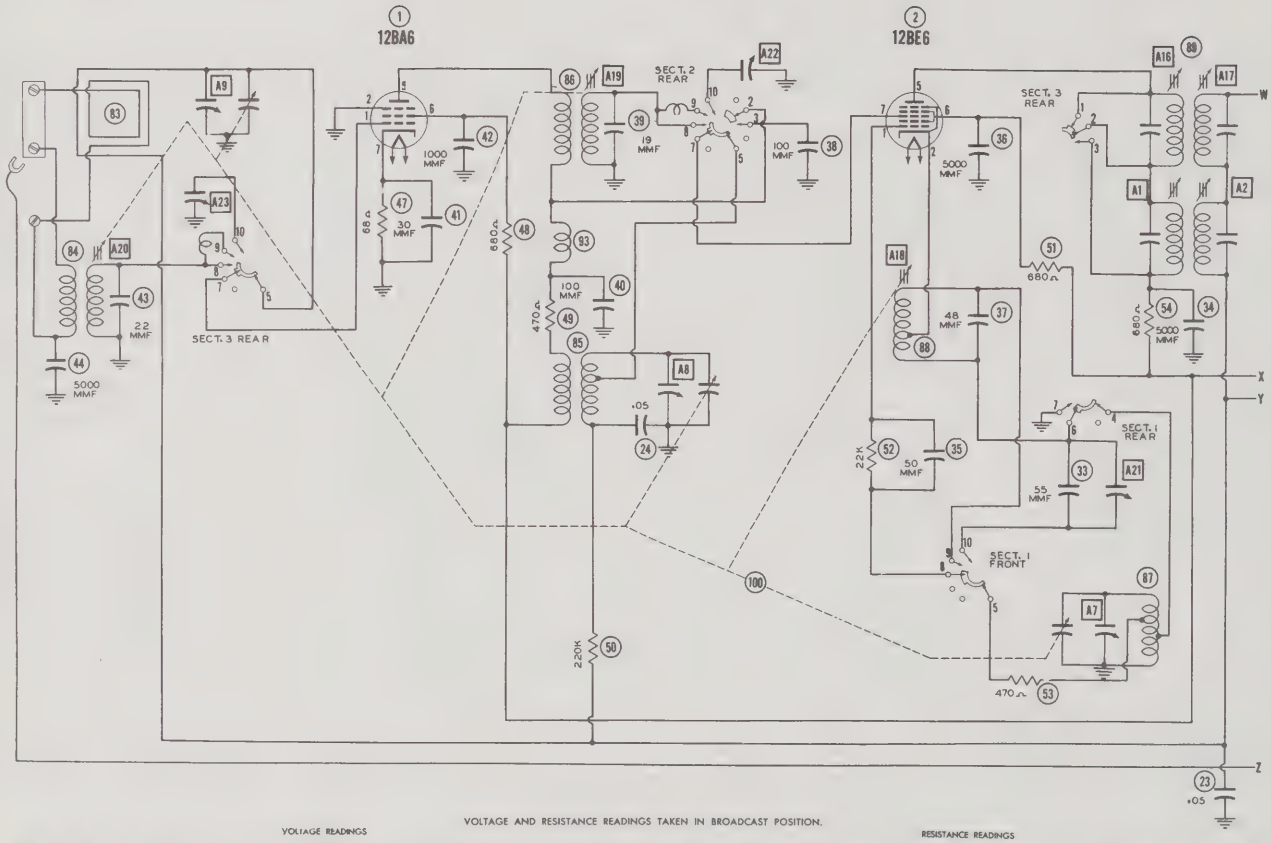
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
47	68Ω	½	63-1737		Blue-Gray-Blk. RF Cathode
48	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. RF Screen
49	470Ω	½	63-1772	BTS-470	Yl.-Vi.-Br. Decoupling
50	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. AVC Network
51	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. Conv. Screen
52	22KΩ	½	63-1841	BTS-22K	Red-Red-Or. Osc. Grid
53	470Ω	½	63-1772	BTS-470	Yl.-Vi.-Br. Parasitic Supp.
54	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. Conv. Decoup.
55	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
56	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. 1st IF Decoup.
57	1000Ω	½	63-1765	BTS-1000	Br.-Blk.-Red Tone Compensation
58	68Ω	½	63-1737		Blue-Gray-Blk. 2nd IF Cathode
59	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. 2nd IF Decoup.
60	3300Ω	½	63-1806	BTS-3300	Or.-Or.-Red Limiter Screen Dropping
61	8200Ω	½	63-1824	BTS-8200	Gray-Red-Red Limiter Plate Decoupling
62	47KΩ	½	63-1856	BTS-47K	Yl.-Vi.-Or. Diode Filter
63	470KΩ	½	63-1898	BTS-470K	Yl.-Vi.-Yl. Diode Load
64	100KΩ	½	63-1870	BTS-100K	Br.-Blk.-Yl. Limiter Grid
65	100KΩ	½	63-1870	BTS-100K	Br.-Blk.-Yl. De-emphasis
66	3900Ω	½	63-1810	BTS-3900	Or.-White-Red Bleeder
67	150KΩ	½	63-1876	BTS-150K	Br.-Grn.-Yl. Diode Load
68	150KΩ	½	63-1876	BTS-150K	Br.-Grn.-Yl. Diode Load
69	4.7 Meg.	½	63-1940	BTS-4.7 Meg.	Yl.-Vi.-Grn. Audio Grid
70	470KΩ	½	63-1898	BTS-470K	Yl.-Vi.-Yl. Audio Plate Load
71	100KΩ	½	63-1870	BTS-100K	Br.-Blk.-Yl. Audio Plate Decoup.
72	470KΩ	½	63-1898	BTS-470K	Yl.-Vi.-Yl. Output Grid
73	120Ω	½	63-1747	BW-½-120	Br.-Red-Br. Output Cathode
74	5600Ω	½	63-1871	BTS-5600	Grn.-Blue-Red Tone Comp.
75	2200Ω	½	63-1799	BTS-2200	Red-Red-Red Tone Comp.
76	1000Ω	½	63-1765	BTS-1000	Br.-Blk.-Red " "
77	270Ω	2	63-1452	BW-2-270	Red-Vi.-Br. Filter
78	330Ω	2	63-1453	BW-2-330	Or.-Or.-Br. "
79	22Ω	1	63-1450	BW-1-22	Red-Red-Blk. Surge Limiter



TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
80	2500Ω	3.6Ω	225Ω tapped @ 2.7Ω	.7Ω	40-508				

DATE 8/48-#4813-24 SET #4813-24



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	12BA6	0V.	0V.	54VAC	65VAC	88VDC	91VDC	1VDC	-	-
2	12BE6	-2VDC§	0V.	79VAC	66VAC	92VDC	90VDC	0V.	-	-
3	12BA6	0V.	0V.	54VAC	44VAC	82VDC	82VDC	0V.	-	-
4	12BA6	0V.	0V.	44VAC	30VAC	80VDC	80VDC	.8VDC	-	-
5	12AU6	0V.	0V.	30VAC	19VAC	11.5VDC	65VDC	0V.	-	-
6	1/2V6	.1VDC	-.5VAC	-.1VDC	19VAC	0V.	-.5VDC	0V.	-.6VDC	33.1VDC
7	35Z5	0V.	0.5VAC	117VAC	80VAC	122VDC	94VDC	0V.	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	12BA6	2.7 Meg.	0Ω	40Ω	45Ω	15KΩ	15KΩ	68Ω	-	-
2	12BE6	22KΩ	.5Ω	53Ω	46Ω	15KΩ	15KΩ	3 Meg.	-	-
3	12BA6	2.7 Meg.	0Ω	40Ω	33Ω	15KΩ	15KΩ	0Ω	-	-
4	12BA6	2.7 Meg.	0Ω	33Ω	25Ω	16KΩ	15KΩ	68Ω	-	-
5	12AU6	100KΩ	0Ω	25Ω	16Ω	3900Ω	12KΩ	0Ω	-	-
6	1/2V6	150KΩ	150KΩ	360KΩ	18Ω	0Ω	510KΩ	0Ω	4.7 Meg.	680Ω
7	35Z5	470KΩ	470KΩ	140Ω	66Ω	54Ω	15KΩ	15KΩ	47KΩ	-	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

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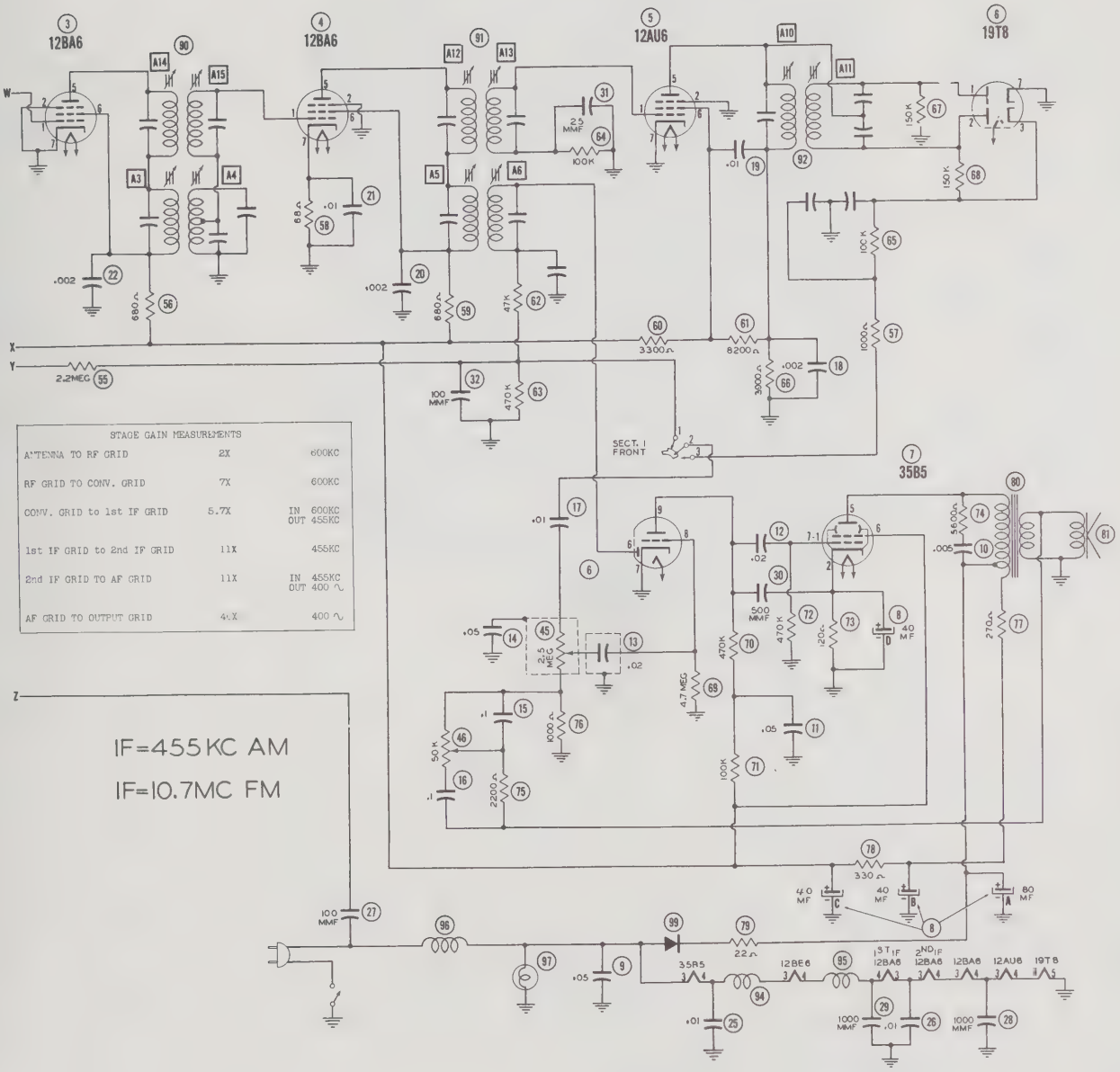

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Calibration marks referred to in Steps below are on outer edge of speaker and correspond directly to dial calibration markings.

Do not use pressure when aligning IF transformers or threads in coil forms will be stripped and make alignment impossible.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 7 (grid) of 12BE6. Low side to chassis.	455KC	BC (fully counter clockwise)	Tuning control fully counter clockwise.	Across voice coil	A1,A2, A3,A4, A5,A6.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	"	1600KC calibration mark	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	"	Tune for maximum output.	"	A8,A9	Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.05 MFD	High side to Pin 1 (grid) of 12AU6. Low side to chassis.	10.7MC (Unmodulated)	FM45 (fully clockwise)	Tuning control fully clockwise	DC probe to Point ⓐ. Common to chassis	A10	Adjust for maximum deflection.
5	.05 MFD	"	"	"	"	DC probe to Point ⓑ. Common to chassis	A11	Use zero center scale VTVM if available. Use enough signal input to give good positive and negative deflection. Adjust A11 for zero deflection.
6	.05 MFD	High side to Pin 1 (grid) of 12BA6 2nd IF Tube (4). Low side to chassis.	"	"	"	DC probe to Point ⓒ. Common to chassis	A12, A13	Adjust for maximum deflection.
7	.05 MFD	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A14, A15	"
8	.05 MFD	High side to pin 7 (grid) of 12BE6. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum deflection. Continue with FM-RF Alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	.01 MFD	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Mod.)	FM45	Tuning control fully clockwise	Vertical input to Point ⓒ. Ground to chassis.	A12, A13, A14, A15	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
5	.01 MFD	Disconnect lead to Pin 7 of 12BE6. Connect 100KΩ resistor from Pin 7 to chassis. High side of sig. gen to Pin 7. Low side to chassis.	"	"	"	"	A16,A17	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Replace lead to Pin 7 of 12BE6.
6	.01 MFD	High side to Pin 1 (grid) of 12BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point ⓑ. Ground to chassis.	A10, A11	Alternately adjust A10 for maximum amplitude & A11 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 9.

FM RF ALIGNMENT

In Steps 9 & 10 slug adjustments should be loosened by applying a hot iron to the cement holding them fast.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	270Ω carbon res.	High side to ant. terminal "F" (Remove line ant. Low side to chassis.	9MC (Unmodulated)	FM100 (center position)	98MC calibration mark.	DC probe to Point ⓒ. Common to chassis	A18	Adjust for maximum deflection.
10	"	"	"	"	Tune for maximum output.	"	A19, A20	Adjust for maximum deflection. Secure slugs with speaker cement.
11	"	"	45MC (Unmodulated)	FM45	45MC calibration mark	"	A21	Adjust for maximum deflection.
12	"	"	"	"	Tune for maximum output.	"	A22, A23	"

FIG. 1

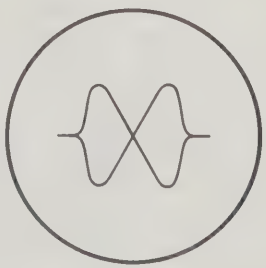
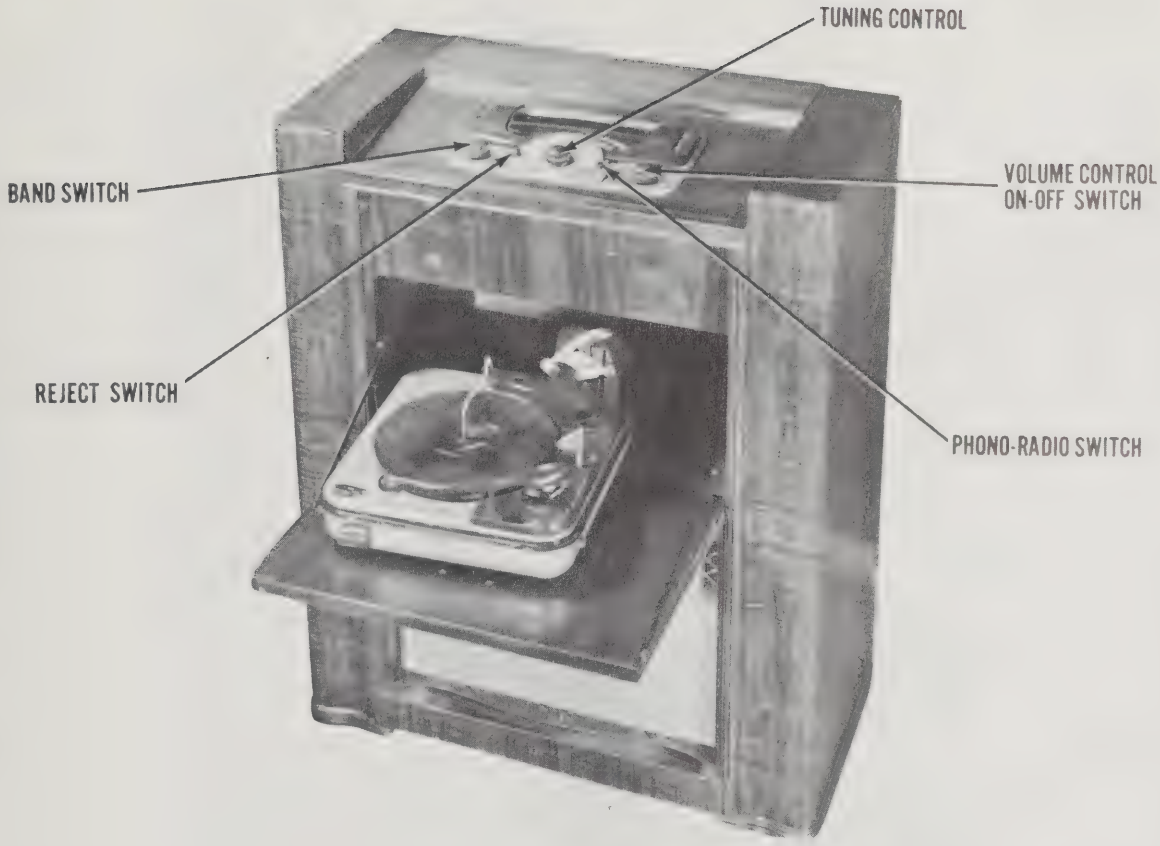


FIG. 2

ZENITH MODEL 9H881, 9H882R, 9H885, 9H888R (Ch. 9E21)

ZENITH MODEL 9H881, 9H882R, 9H885, 9H888R (Ch. 9E21)



ZENITH MODEL 9H881, 9H882R, 9H885, 9H888R (Ch. 9E21)

ZENITH MODEL 9H881

TRADE NAME	Zenith, Models 9H881, 9H882R, 9H885, 9H88R (Ch. 9E21)		
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill.		
TYPE SET	AC Operated Combination Phono-Radio, AM - 2 Band FM Superheterodyne Receiver with Loop Antenna.		
TUBES (NINE)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 1st IF and Phono Amp., 6AU6 2nd IF Amp., 6AU6 Limiter, 6T8 Disc.-Det.-AF-Amp., 6J5 Phono Osc., 6V6GT Power Output, 5Y3GT Rectifier.		
POWER SUPPLY	110-120 Volts AC	RATING	.84 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC	FREQ. MOD.	42-48.5MC, 88-108MC

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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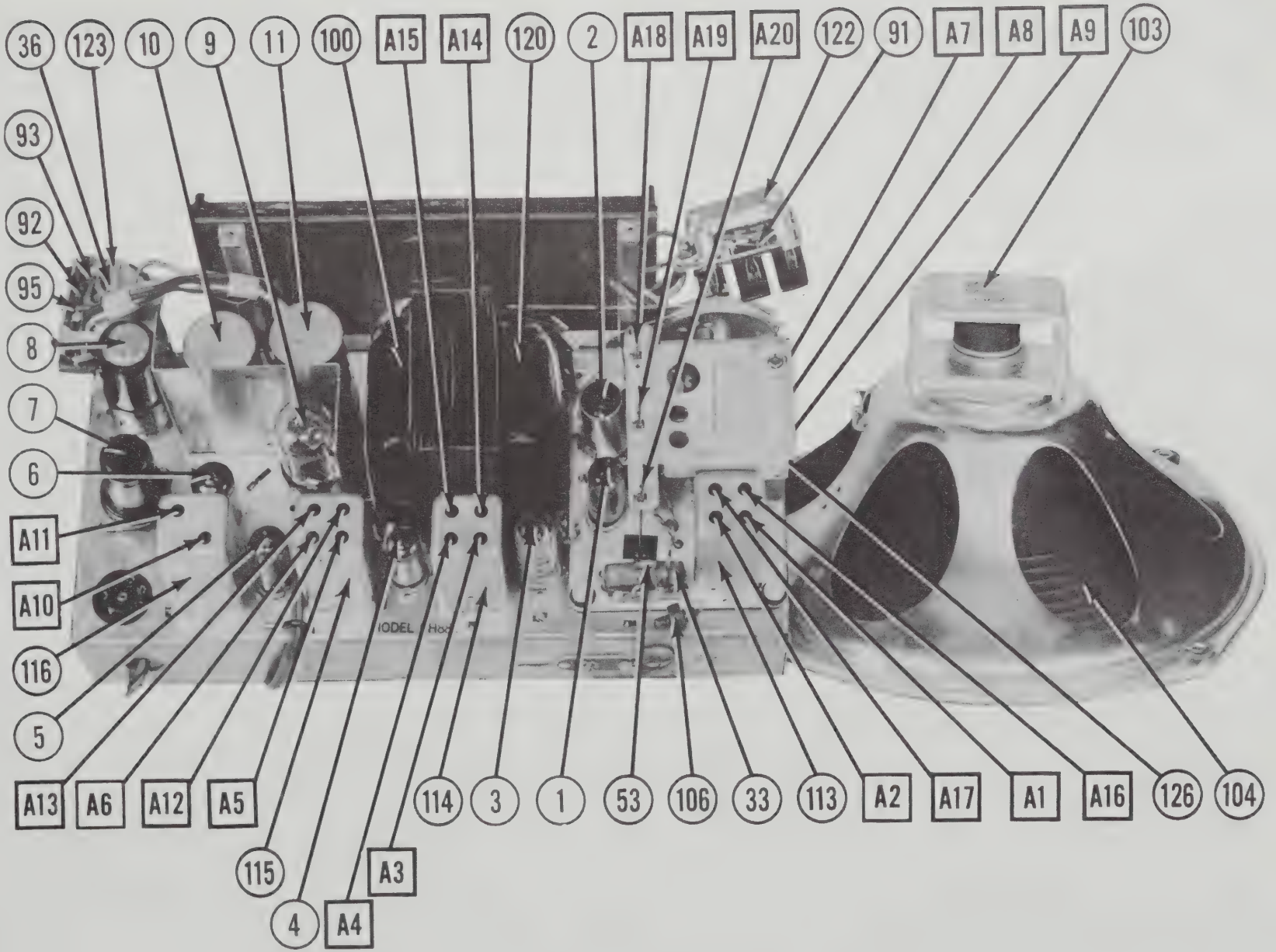
DATE 8/48-#4813-25 SET #43-FOLDER #25


36
123
10
9
11
100
A15
A14
120
2
A18
A19
A20
122
91
A7
A8
A9
103
93
92
95
8
7
6
A11
A10
116
5
A13
A6
A12
A5
115
4
A4
A3
114
3
1
53
106
33
113
A2
A17
A1
A16
126
104

ZENITH MODEL 9H881, 9H882R, 9H885, 9H888R (Ch. 9E21) PAGE 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	1st IF & Phono Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6AU6	6AU6	7BK	
5	Limiter	6AU6	6AU6	7BK	
6	Disc.-Det.-AF Amp.	6T8	6T8		
7	Phono Osc.	6J5	6J5	6C	
8	Power Output	6V6GT	6V6GT	7AC	
9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10A	40	450	22-1720		UP4445	DY-314	EL-424*	● Filter
B	40	450	22-1720					■ "
C	40	25	22-1720		BR502			▲ Cathode Bypass
11A	40	450	22-1710		UP4245	DY-3x20-450*#	EL-420*#	● Filter
B	15	450	22-1719					▲ "
12	.005	400	22-1041	484-005	DT6D5	MPH-6-005	TC-25	Line Filter
13	.0022	600	22-1754	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
14	.05	600	22-171	684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
15	.01	400	22-1718	484-01	DT4S1	ST-4-01	TC-11	" "
16	.02	600	22-196	684-02	DT6S2	ST-6-02	TC-12	RF Bypass Pwr. Supply
17	.001	200	22-1717	484-001	DT6D1	ST-6-001	TC-21	Tone Comp.
18	.2	200	22-1531	484-.2	DT2P1	ST-2-2	TC-2	" "
19	.02	600	22-830	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
20	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	" "
21	.1	200	22-1418	484-.1	DT2P1	ST-2-1	TC-1	Phono Osc. Grid Cap.
22	.02	600	22-830	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
23	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	Lim. Decoupling
24	.01	200	22-1835	484-01	DT2S1	ST-4-01	TC-11	Lim. Screen Bypass
25	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	2nd IF Decoupling
26	.01	200	22-1385	484-01	DT2S1	ST-4-01	TC-11	2nd IF Screen Bypass
27	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	2nd IF Cathode Bypass
28	.01	200	22-1385	684-01	DT2S1	ST-4-01	TC-11	Filament Bypass
29	.002	600	22-1220	684-002	DT6D2	ST-6-002	TC-22	1st IF Decoupling
30	.001	200	22-1717	484-001	DT6D1	ST-6-001	TC-21	1st IF Screen Bypass
31	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	1st IF Cathode Bypass
32	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
33	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	" "
34	100		22-1669	1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling-Cer.
35	75		22-1256	1468-000075	5W5Z7	MOS.5-47	1FM-475	Tone Comp.-Cer.
36	250		22-1136	1468-00025	5W5T25	MO.5-325	1FM-325	" "
37	50		22-1664	1468-00005	5W5Z5	MO.5-45	1FM-45	Phono Osc. Coupling-Cer.
38	50		22-1532	1468-00005	5W5Z5	MO.5-45	1FM-45	Phono Osc. Feedback
39	100		22-365	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
40	25		22-1507	1468-000025	5W5Q25	MO.5-425	MS-425	Limiter Grid Filter-Cer.
41	100		22-1669	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
42	1000		22-348	1468-001	1W5D1	MO.3-21	1FM-21	AVC Filter
43	55		22-1691					Fixed Trimmer-Cer.
44	5000		22-1706	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Plate Decoup.-Cer.
45	50		22-1367	1468-00005	5W5Z5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
46	100		22-1669	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
47	19		22-1688					Fixed Trimmer-Cer.
48	48		22-1689					" " "
49	5000		22-1706	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Screen Bypass-Cer.
50	100		22-1669	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
51	30		22-1705	1468-00004	5W5Q3	MO.5-43	1FM-44	RF Cathode Bypass-Cer.
52	1000		22-1676	1467-001	1W5D1	MW.5-21	1FM-21	RF Screen Bypass-Cer.
53	10		22-1438	1468-00001	5R5.1	MOS.5-41	MS-41	Fixed Trimmer-Cer.
54	22		22-1506					" " "

*Parallel sections to obtain desired capacity.
#Omit one section.

PARTS LIST AND DESCRIPTIONS (Continued)

(TONE) CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000∩)	REPLACEMENT DATA: ZENITH PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
101		2.5 ohms	9 M1111-henries	S-13800				

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTE
102	7000Ω	3.3Ω	560Ω	.6Ω	95-1063				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
103	PM	3.3Ω	49-624			
	CONE DIA.	VC DIA.				
104	11-3/8"	1"	208-624			

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: MEISSNER PART No.	
105	Lopp Ant.		.5Ω	S-14305		
106	Ant. Loading Coil		2.5Ω	S-14195		
107	FM Ant.Coil	0Ω	0Ω	S-14192		
108	BC RF Coil	2.5Ω	10Ω	S-13974		
109	FM RF Coil	0Ω	0Ω	S-13871		
110	BC Osc.Coil		9.8Ω	S-11157		
111	FM Osc.Coil		0Ω	S-12259		
112	Pre-Amp. Osc.Coil		2Ω	S-12603		
113A	AM 1st IF	7.2Ω§	8Ω**	S-13970		§Includes both primaries.
B	FM 1st IF					**Includes both secondaries.
114A	AM 2nd IF	8.2Ω§		S-13971		
B	FM " "					
115A	AM 3rd IF	8.5Ω§	7.5Ω	S-13972		
B	FM " "		.8Ω			
116	Disc.Trans.	.4Ω	.4Ω	S-13973		
117	RF Choke Coil		.2Ω	S-14126		
118	Line Choke Coil			S-12256		
119	"			S-12256		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
120	Bayonet	6-8	0.25	Blue	100-36		Type 44

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
121	Switch	85-424	Band
122	"	S14260	Tone RH
123	"	S14261	" LH
124	"	85-421	Radio-Phono
125	"	85-422	Phono-Reject
126	Tuning Gang	22-1678	(31-516MMF 15-213MMF, 15-88MMF)
A21	Trimmer	22-1686	FM Osc. Adj.
A22	"	22-1685	FM RF Adj.
A23	"	22-1685	FM Ant. Adj.
	Dial Scale	S14270	Includes Strip Assembly
	Dial Pointer	58-209	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	
55A	1 Meg.	½	63-1588	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 55A per instructions
C	Switch		" "	41	SW-A	" " " " "

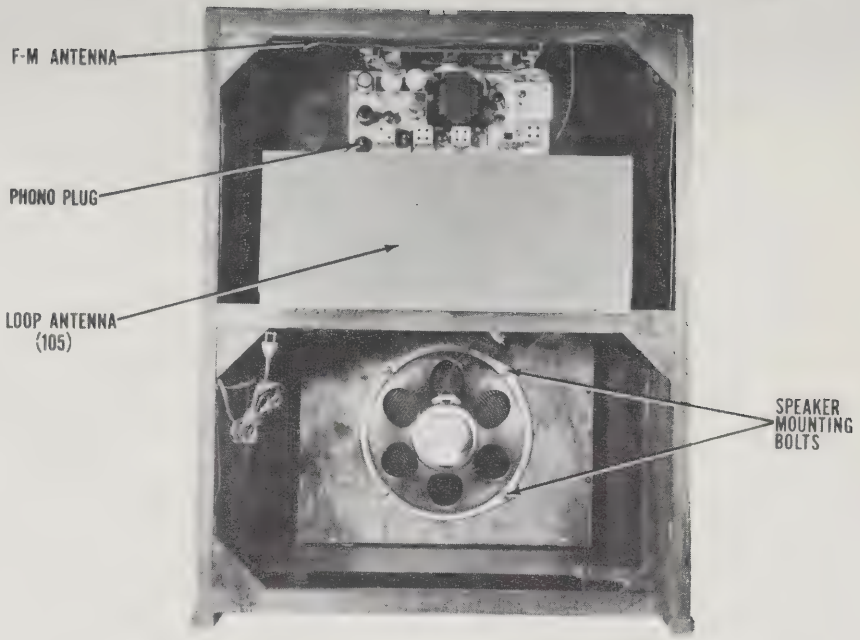
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
56	1 Meg.	½	63-1912	BTS-1 Meg.	Brn.-Blk.-Grn. AVC Network
57	68Ω	½	63-1737		Blue-Gray-Blk. RF Cathode
58	33KΩ	1	63-957	BTA-33K	Or.-Or.-Or. RF Screen
59	470Ω	½	63-1771	BTS-470	Yl.-Vi.-Br. Decoupling
60	22KΩ	½	63-1841	BTS-22K	Red-Red-Or. Conv. Grid
61	15KΩ	1	63-1065	BTA-15K	Br.-Grn.-Or. Conv. Screen
62	22KΩ	½	63-1842	BTS-22K	Red-Red-Or. Osc. Grid
63	470Ω	½	63-1772	BTS-470	Yl.-Vi.-Brn. Parasitic Supp.
64	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. AVC Network
65	2.2 Meg.	½	63-1926	BTS-2.2 Meg.	Red-Red-Grn. " "
66	2200Ω	½	63-1800	BTS-2200	Red-Red-Red Conv. Plate Decoupling
67	2200Ω	½	63-1800	BTS-2200	Red-Red-Red 1st IF Plate Decoupling
68	680Ω	½	63-1779	BTS-680	Blue-Gray-Br. 1st IF Screen Decoupling
69	10KΩ	½	63-1827	BTS-10K	Br.-Blk.-Or. Tone Compensation
70	33KΩ	½	63-1848	BTS-33K	Or.-Or.-Or. Phono Osc. Plate
71	68Ω	½	63-1733		Blue-Gray-Blk. 2nd IF Cathode
72	22KΩ	½	63-1841	BTS-22K	Red-Red-Or. 2nd IF Screen
73	2200Ω	½	63-1800	BTS-2200	Red-Red-Red 2nd IF Plate Decoup.
74	22KΩ	½	63-1841	BTS-22K	Red-Red-Or. 1st IF Screen
75	22KΩ	2	63-1566	BT-2-22K	Red-Red-Or. Limiter Screen
76	8200Ω	½	63-1824	BTS-8200	Gray-Red-Red Limiter Plate Decoup.
77	3900Ω	½	63-1810	BTS-3900	Or.-White-Red Bleeder
78	100KΩ	½	63-1870	BTS-100K	Br.-Blk.-Yl. Limiter Grid
79	47KΩ	½	63-1856	BTS-47K	Yl.-Vi.-Or. AM Diode Filter
80	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. Diode Load
81	100KΩ	½	63-1869	BTS-100K	Br.-Blk.-Yl. De-emphasis
82	33KΩ	½	63-1848	BTS-33K	Or.-Or.-Or. De-emphasis
83	150KΩ	½	63-1876	BTS-150K	Br.-Grn.-Yl. Disc. Diode Load
84	150KΩ	½	63-1876	BTS-150K	Br.-Grn.-Yl. " " "
85	15 Meg.	½	63-1961	BTS-15 Meg.	Br.-Grn.-Blue 1st Audio Grid
86	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. 1st Audio Plate Load
87	470KΩ	½	63-1897	BTS-470K	Yl.-Vi.-Yl. Output Grid
88	270Ω	1	63-1369	BW-1-270	Red-Vi.-Br. Output Cathode
89	3900Ω	½	63-1810	BTS-3900	Or.-White-Red Tone Compensation
90	390Ω	½	63-1768	BTS-390	Or.-White-Br. " "
91	4700Ω	½	63-1813	BTS-4700	Yl.-Vi.-Red " "
92	680Ω	½	63-1778	BTS-680	Blue-Gray-Br. " "
93	33Ω	½	63-1722	BW-½-33	Or.-Or.-Blk. " "
94	33Ω	½	63-1722	BW-½-33	Or.-Or.-Blk. " "
95	1.5 Meg.	½	63-1918	BTS-1.5 Meg.	Br.-Grn.-Grn. " "
96	4700Ω	1	63-1565	BTA-4700	Yl.-Vi.-Red Filter
97A	1000Ω	5	63-1589	AB-1000	Br.-Blk.-Red Filter
B	200Ω	3	63-1569	AB-200	Red-Blk.-Br. "
98	8200Ω	½	63-1824	BTS-8200	Gray-Red-Red Parasitic Supp.
99	1 Meg.	½	63-1911	BTS-1 Meg.	Br.-Blk.-Grn. Phono Osc. Grid
127	68Ω	½	63-1737		Blue-Gray-Blk. 1st IF Cathode

TRANSFORMER (POWER)

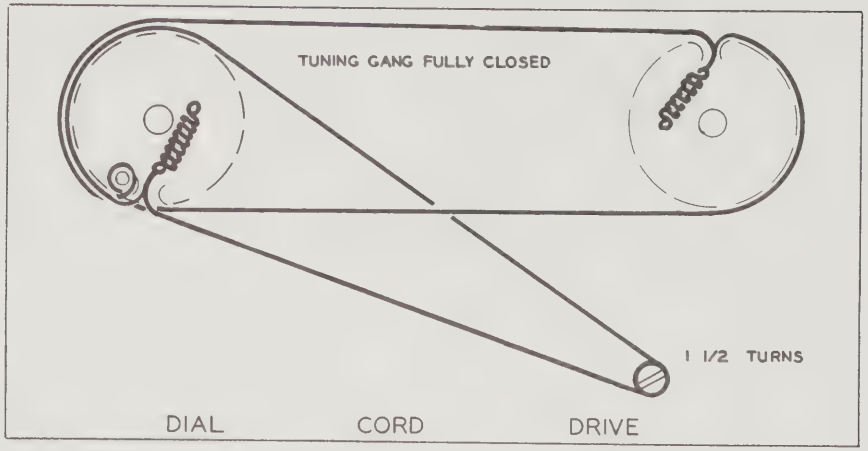
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
100	117V AC @ .84A	660V CT @ .115A DC	5.2V AC @ 2.0A	6.5V AC @ 3.0A	55-1062	P-6013‡	T-22R32‡	

‡Drill new mounting holes.
†Mount vertical with universal mounting brackets.

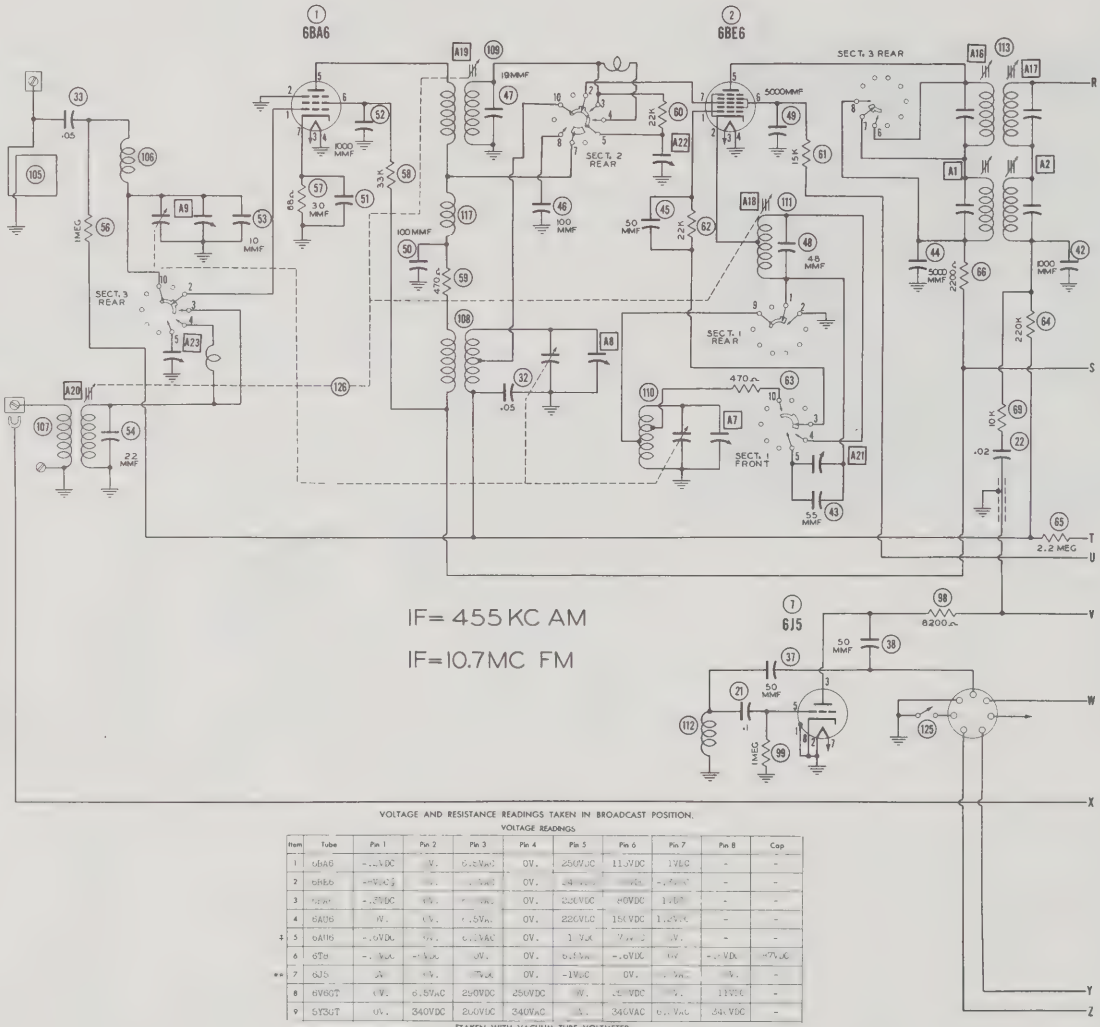


DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs.
2. Unsolder antenna leads from terminals on chassis.
3. Remove phono-motor and phono-pickup plug from chassis.
4. Unsolder speaker leads from speaker.
5. Lift up on plastic dial escutcheons. Remove four Phillips head screws holding push-button assemblies to dial escutcheons.
6. Remove four plug buttons from front of cabinet covering chassis mounting screws.
7. Remove four hex head screws holding chassis in cabinet. Remove chassis from cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



DATE 8/48-#4813-25 SEP. #43-FOLDER #25



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	-1.1VDC	0V.	6.2VAC	0V.	250VDC	115VDC	1VDC	-	-
2	6BE6	-1.1VDC	0V.	6.2VAC	0V.	250VDC	80VDC	1VDC	-	-
3	6AV6	-1.3VDC	0V.	6.2VAC	0V.	220VDC	80VDC	1VDC	-	-
4	6AU6	0V.	0V.	6.3VAC	0V.	220VDC	150VDC	1.3VDC	-	-
‡ 5	6AV6	-1.0VDC	0V.	6.2VAC	0V.	1.1VDC	0V.	0V.	-	-
6	6T8	-1.1VDC	-1.1VDC	0V.	0V.	6.3VAC	-1.6VDC	0V	-1.1VDC	-17VDC
** 7	6J5	0V.	0V.	6.3VAC	0V.	-1VDC	0V.	0.3VDC	0V.	-
8	6V6GT	0V.	6.3VAC	250VDC	250VDC	0V.	0.5 VDC	0V.	11VDC	-
9	5Y3GT	0V.	340VDC	280VDC	340VAC	0V.	340VAC	0.3VAC	34.VDC	-

‡TAKEN WITH VACUUM TUBE VOLTMETER
RADIO-PHONO SWITCH IN PHONO POSITION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	0.4 Meg.	0	.1M	0	30K	0.2K2	0	-	-
2	6BE6	0.45	0	.1M	0	40K	0	0.4 Meg.	-	-
3	6AV6	2.5 Meg.	0	.1M	0	33K	0	0.2	-	-
4	6AU6	0.2M	0	.1M	0	45K	0.2K2	0	-	-
‡ 5	6AV6	1.5MEG	0	.1M	0	1.1 Meg.	0.2K2	0	-	-
6	6T8	1.1MEG	0.2K2	30 0K2	0	.1M	0.2K2	0	1.1 Meg.	0.2 K
** 7	6J5	0.2M	0	76K2	INF.	1 Meg.	0.2K2	1	0.2	-
8	6V6GT	0.2	.1M	30K2	0.1K2	470K2	0.2K2	0	0.2K2	-
9	5Y3GT	INF.	30K2	35K2	0	INF.	0.2K2	.1M	0.2K2	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

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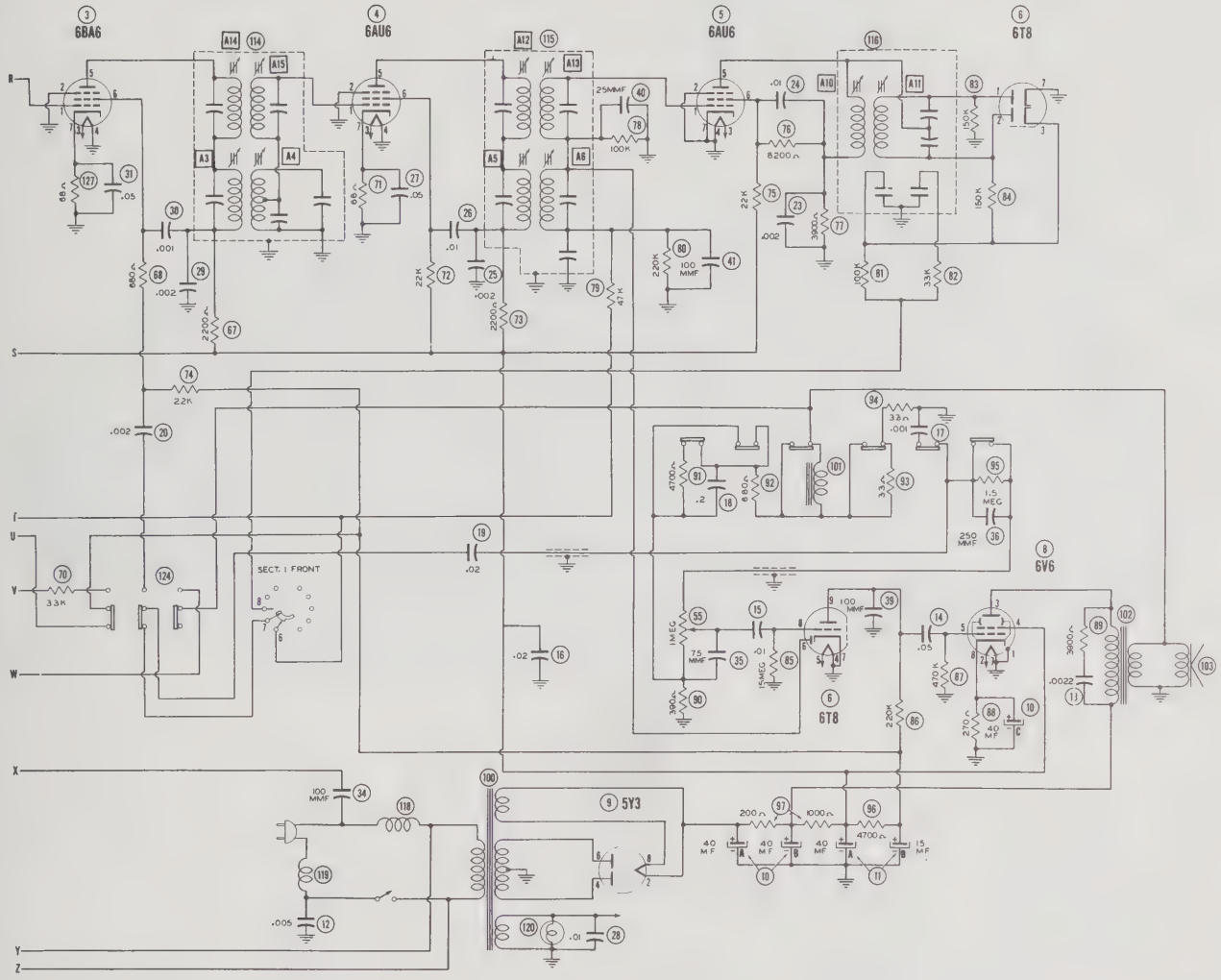
6BA6
6AU6
6AU6
6T8
6V6
6T8
5Y3
SECT. 1 FRONT
STAGE GAIN MEASUREMENTS
ANTENNA TO RF GRID 2X 600KC
RF GRID TO CONV. GRID 7X 600KC
CONV. GRID to 1st IF GRID 5.7X IN 600KC OUT 455KC
1st IF GRID TO AF GRID 11X IN 455KC OUT 400 Ω
AF GRID TO OUTPUT GRID 50X 4Ω

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use small insulated screwdriver for all adjustments. Care should be excercised when adjusting IF slugs as too much pressure will strip the screw threads and adjustment will be impossible.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC (fully counter-clock-wise)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4, A5,A6	Adjust for maximum output.
2		Loop	1600KC	"	1600KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	"	Tune for maximum output.	"	A8,A9	Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Lead to VTVM must be well shielded.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.05 MFD	High side to Pin 1 (grid) of 6AU6 limiter (5). Low side to chassis.	10.7MC (Unmodulated)	FM45 (fully clock-wise)	Tuning cap. fully open.	DC probe in series with 200K Ω to Point Ⓐ. Common to chassis.	A10	Adjust for maximum deflection.
5	.05 MFD.	"	"	"	"	DC probe in series with 200K Ω to Point Ⓑ. Common to chassis	A11	Use a zero center scale VTVM if available and adjust for zero deflection.
6	.05 MFD.	High side to Pin 1 (grid) of 6AU6 2nd IF Tube (4). Low side to chassis.	"	"	"	DC probe in series with 200K Ω to Point Ⓒ. Common to chassis.	A12, A13	Adjust for maximum deflection.
7	.05 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A14, A15	"
8	.05 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A16, A17	Adjust for maximum deflection. Continue with FM-RF Alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	.05 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Mod.)	FM 45 (fully clock-wise)	Tuning cap. fully open.	Vertical input to Point Ⓒ. Ground to chassis.	A12,A13, A14,A15	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
5	.05 MFD	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A16, A17	"
6	.05 MFD	High side to Pin 1 (grid) of 6AU6 2nd IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point Ⓑ. Ground to chassis.	A10, A11	Alternately adjust A10 for maximum amplitude and A11 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Use only enough output from sig. gen. to give useable pattern in order to prevent saturation of limiter. Continue with FM-RF Alignment.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	270Ω carbon resistor	High side to FM ant. terminal. Low side to chassis. (Disconnect line antenna)	98MC (Unmodulated)	FM100 (center position)	98MC	DC probe in series with 200K Ω resistor to Point Ⓒ. Common to chassis	A18	Adjust for maximum deflection.
10	"	"	"	"	Tune for maximum deflec.	"	A19, A20	"
11	"	"	45MC (Unmodulated)	FM45	45MC	"	A21	"
12	"	"	"	"	Tune for maximum deflec.	"	A22, A23	"

FIG. 1

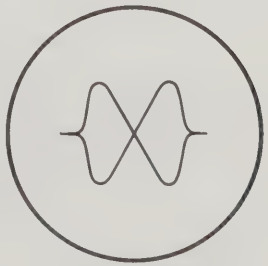
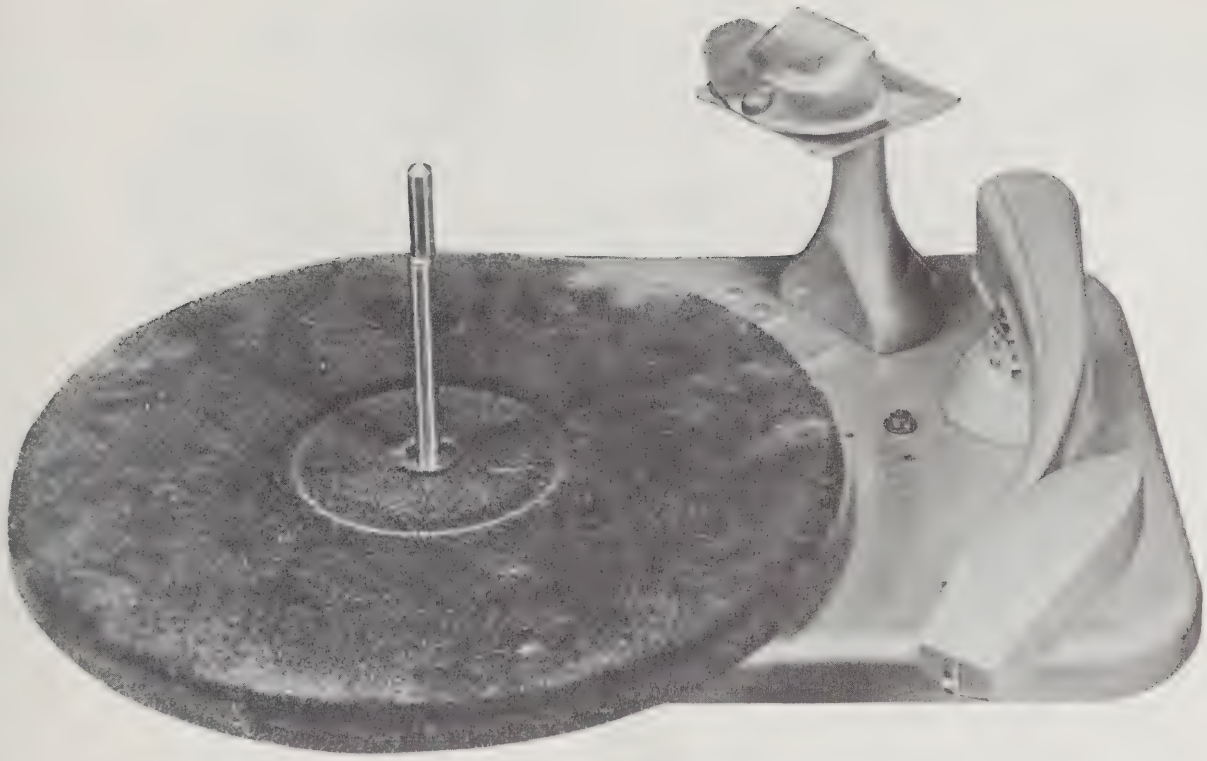


FIG. 2

MOTOROLA
MODEL RC-30



TOP VIEW

MOTOROLA
MODEL RC-30

GENERAL INFORMATION

The record changer RC-30 is an automatic, solenoid trip, single post changer, designed to play automatically ten 10-inch records or eight 12-inch records, not intermixed. The last record will be repeated until the changer is turned off.

The "motor" and "reject" switches required to operate this changer are part of the radio receiver.

Manufactured by
MOTOROLA, INC.—4545 W. Augusta Blvd., Chicago 51, Illinois

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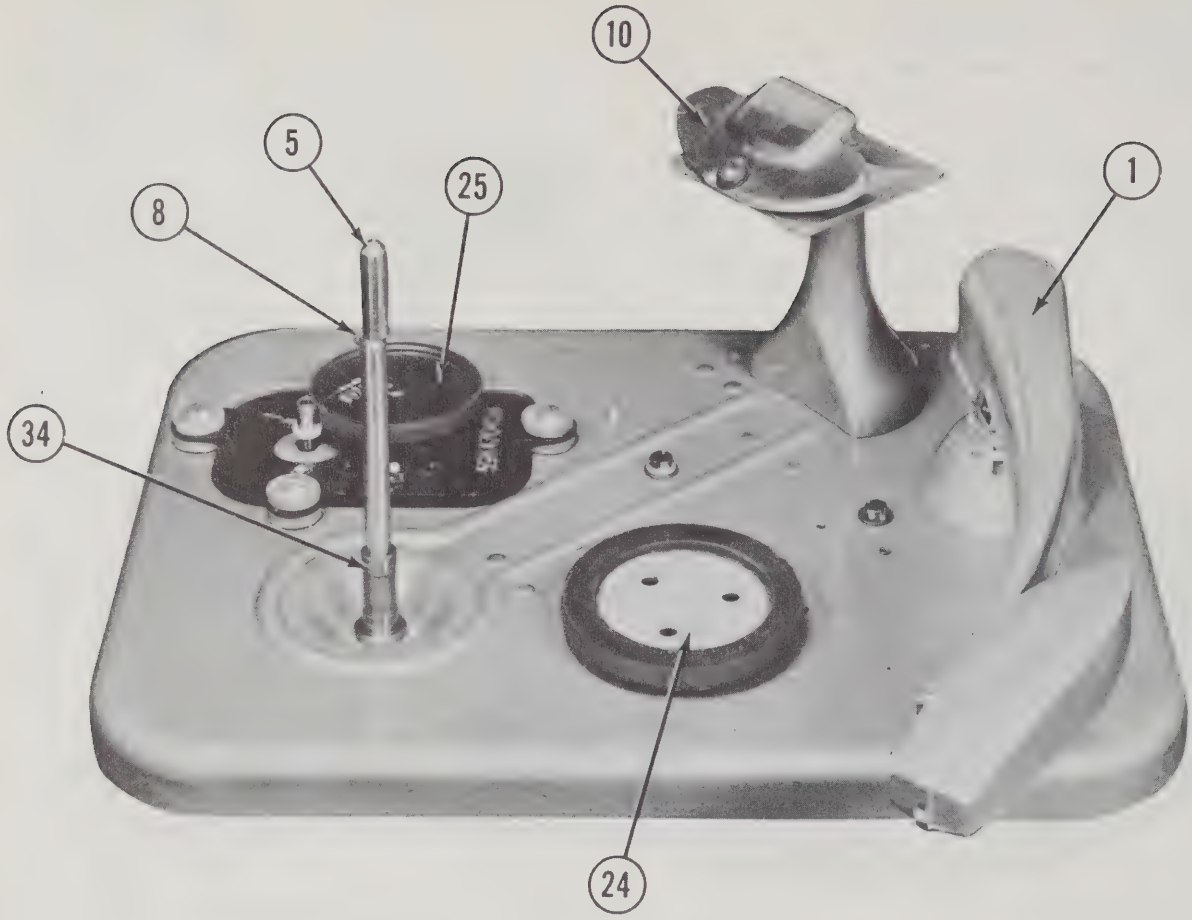


TOP VIEW LESS TURNTABLE

LOADING

1. To set for correct record size, rotate the record support plate (in either direction), so that the desired number, which is stamped on the support plate, faces the spindle.

2. Place the record clamp in a position pointing away from the turntable.

3. Rotate the record post cap (5) (clockwise) 180° until it snaps into a position which is out of line with record post (34).

4. Place a stack of records on the record spindle so they will rest on the record support plate (10) and the eccentric of the eccentric and tube assembly (8).

5. Place the record clamp so that it will rest on top of the records. The changer is now ready to play, automatically, the entire stack of records.

UNLOADING

1. After the last record has been played, allow the changer to go through its complete change cycle, returning the pickup arm to the record. As soon as this occurs, lift the pickup arm off the record and place it on the arm rest (36).

2. Turn the spindle cap (5) so that it will align with the record post (34).

3. Pivot the record clamp backward and remove the records.

CHANGE CYCLE

As the pickup arm moves to within 1⅞" of the record post, the trip screw (59) of the trip arm (57B) is moved against the trip lever (41). This actuates the trip lever which, in turn, closes the trip switch (43). Closing of the trip switch energizes the solenoid coil (45), causing the core (44) to pull in; and through the actuation of the bell crank (52), the drive arm (68) is moved a definite amount, bringing the drive pulley (24) in contact with the turntable rim, which, in turn, rotates the cam wheel through the idler gear (73), thereby starting the change cycle.

As the cam wheel (63) turns, the roller of the bell crank lever (52) follows the rim of the cam wheel (63) and, as a result, causes the drive arm to hold the drive pulley (24) firmly against the turntable rim.

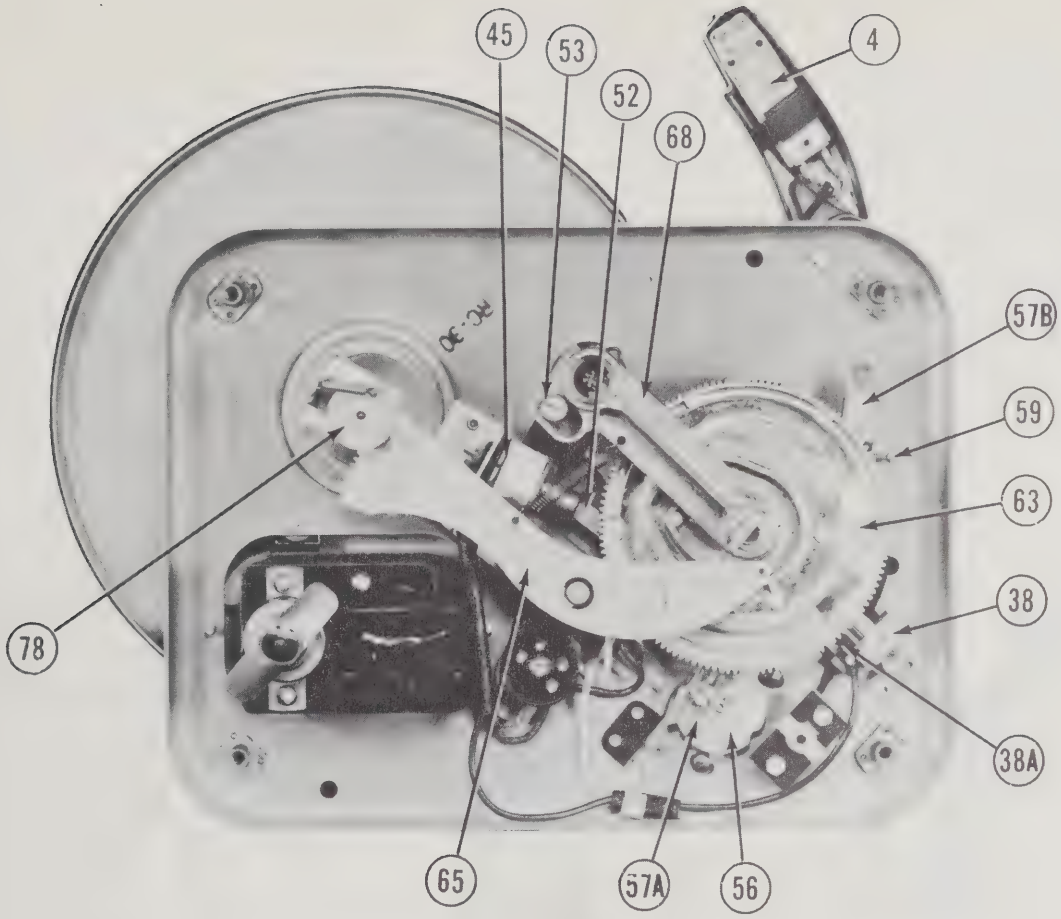
Immediately after the cam wheel starts to rotate, the bottom leaf of the safety switch (38) rides up the inclined portion of the cam surface (63A), cutting off current to the solenoid coil.

The lift rod (11) now rides up the incline of cam surface (63A), raising the pickup arm off the record.

The stud of the selector lever (57A), which is following the groove (63B) of the cam wheel, actuates the trip arm (57B), and, as a result, swings the pickup arm out to clear the records.

The roller of the gear arm (65), riding in the groove located on the bottom of the cam wheel, actuates the gear arm causing the gear arm to rotate the spindle gear (49), and, in turn, the eccentric (8). When the eccentric is in line with the spindle cap (5), it allows a record to drop over the eccentric. When the eccentric is rotated back, it carries the record with it, thereby allowing the record to drop to the turntable when the eccentric aligns with record post (34).

As the cam wheel continues to rotate, the stud of the selector lever (57A), riding in the groove (63B) of the cam wheel, moves the pickup arm in positioning it for set-down. The set-down point of the pickup arm is determined by the position of the record support plate (10). The selector shaft and plate assembly (56), which rotates with the record support plate, moves the selector lever (57A). This action changes the angle between the trip arm (57B) and the



BOTTOM VIEW

selector lever (57A), which, in turn, positions the pickup arm for proper set-down.

The pickup lift rod (11) now rides down the incline portion of cam track (63A), lowering the pickup arm (1) to the record.

The roller of the bell crank lever (52), which is riding around the rim of the cam wheel, is now pulled into the detent of the rim by the tension spring (74). This action causes the bell crank to move the drive arm (68), which, in turn, disengages the drive pulley (24) from the turntable rim, completing the change cycle. Flange (37A) serves as a brake to the drive pulley (24), when it is disengaged from the turntable, to prevent recycling.

ADJUSTMENTS

Drive Pulley Adjustment

This adjustment must be made very carefully to assure proper cycling. Too loose an adjustment may cause uneven cycling or no cycling at all. Too tight an adjustment will cause slow cycling and undue motor wear.

Correct adjustment may be made as follows:

1. Set the changer in cycle and stop the turntable when the pickup arm comes back to almost the set-down position.

2. Loosen the eccentric stud (53), so that the drive pulley (24) is moved away from the turntable.

3. Using a screwdriver, turn the eccentric stud until the pickup arm starts to move when rotating the turntable clockwise by hand. Do not hold screwdriver on eccentric stud while checking the adjustment.

4. If the pickup arm moves down when the turntable is rotated clockwise, but not up with a counterclockwise rotation, the critical position of the adjustment has been reached.

5. Tighten the eccentric stud just far enough so that the pickup arm will raise when rotating the turntable counterclockwise. This completes the adjustment.

Record Support Platform Adjustment

1. Turn the spindle cap (5) so that it is in line with the record post (34).

2. Turn the record support plate (10) to the 10-inch position, making sure it is snapped into position by the selector spring (42).

3. Place a standard 10-inch record on the spindle, holding it in line with the eccentric (8) and the support plate (10).

4. The edge of the record and the support plate should be equal distance at all points. This is to allow the records to drop evenly. To make the proper adjustment, loosen the two Allen set screws just under the support plate. Turn the support plate until adjustment is correct and tighten the set screws.

5. The distance between the record and the support plate should be just enough for the record to clear the edge of the plate. This distance can be varied by loosening the two screws (40) and sliding the record support post (23) forward or backward until the distance is correct.

6. Tighten the screws (40).

Set-Down Point

1. Turn record support to 12-inch position.

2. Place a standard 12-inch record on the turntable.

3. Start the changer, allowing it to go through a complete change cycle.

4. Observe the point where the needle contacts the record. This should be ⅛ inch in from the edge of the record.

A PHOTOFACT "EXPLODED" VIEW

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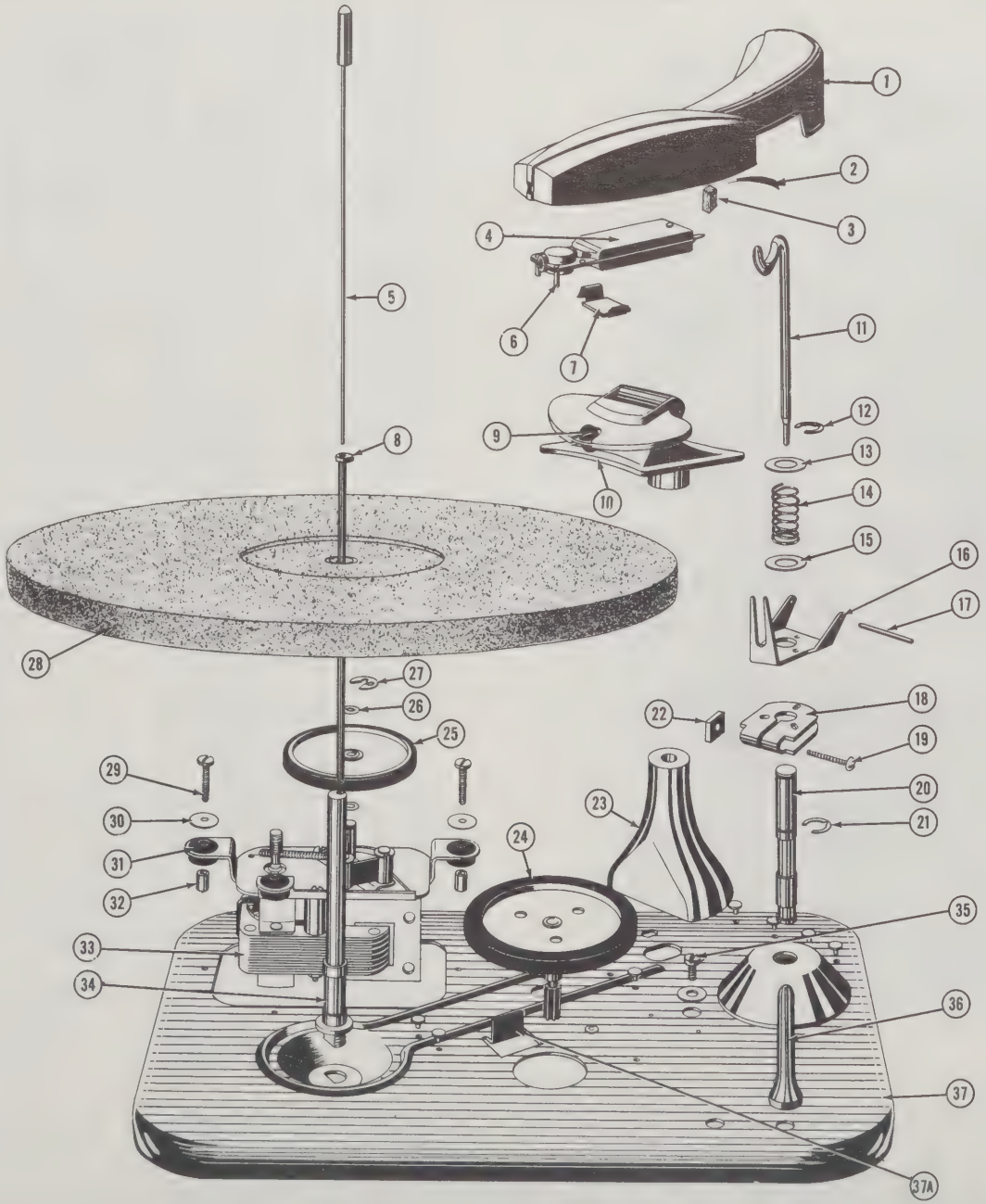

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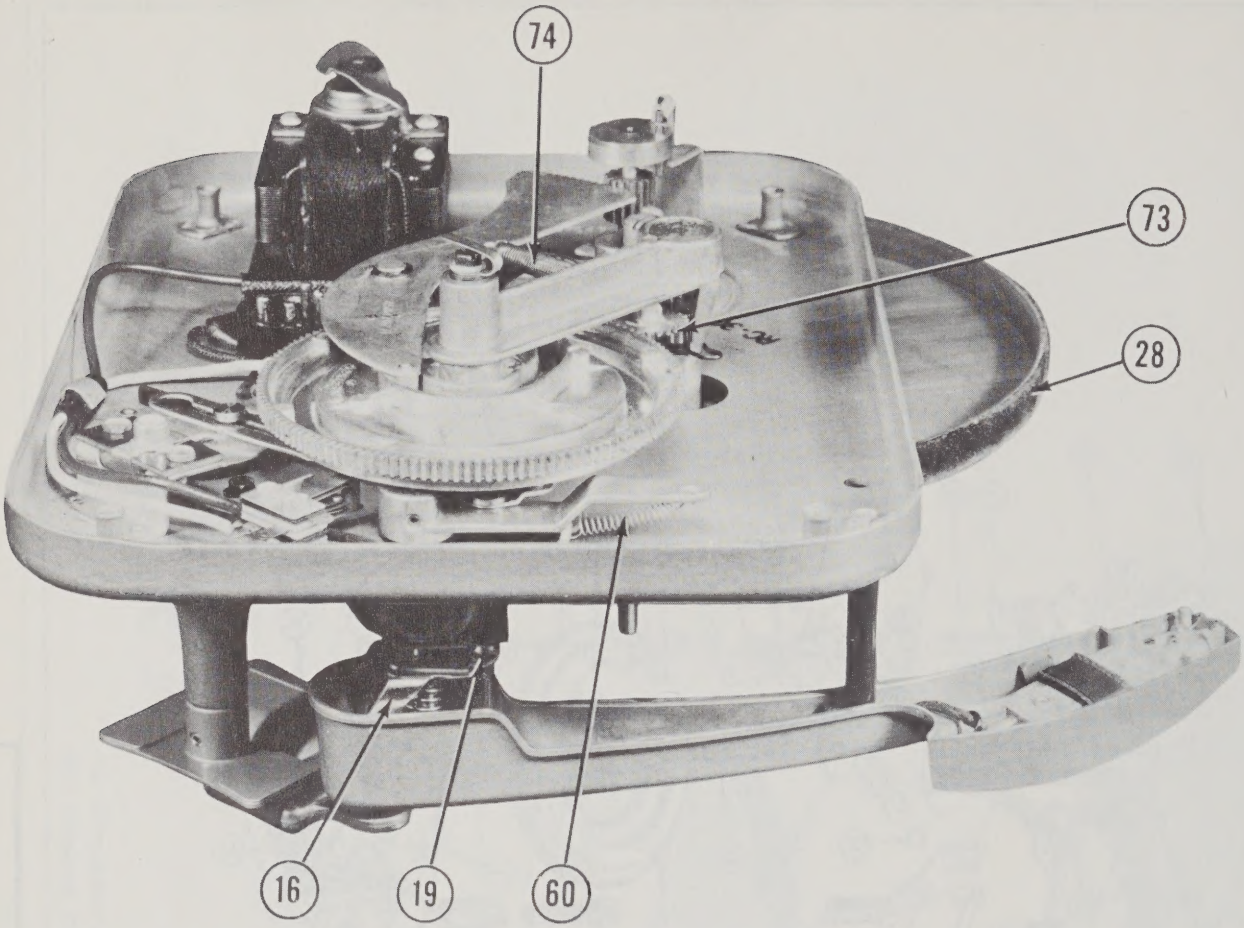


BOTTOM SIDE VIEW

5. If the arm is out of position, Place a stack of eight 12-inch records on the turntable, cycle the changer and stop it just before the needle touches the top record. As a result, the stud of the selector lever (57A) will still be in the groove of the cam wheel, preventing horizontal movement of the trip arm while the pickup arm adjustment is being made.

6. Loosen the clamp screw (19) and move the pickup arm until the needle is properly positioned.

7. Tighten the clamp screw and check the adjustment. This adjustment should also take care of the 10-inch set-down, although a minor compromise adjustment to take care of both can be made, if necessary.

Trip Adjustment

1. Draw a 3¾-inch diameter circle on a piece of paper, punch a ¼-inch hole in the exact center, and place on the turntable.

2. Turn the record support plate (10) to the 12-inch position.

3. Start the changer, allowing it to go through its change cycle; at the end of the change cycle, the pickup arm will be in a rest position along the side of the turntable. Do not turn off the changer.

4. Pick up the arm and move it slowly toward record post. Correctly adjusted, the changer should trip as the needle crosses the circle line. Correct adjustment may be obtained by turning the adjusting screw (59). Turning the screw counterclockwise delays the tripping, and clockwise advances the tripping.

Record Dropping Mechanism

At the end of the change cycle, the eccentric (8) should be in line with the record post (34). If they are not in line, readjust as follows:

1. Loosen the slab head set screw (50) in the spindle gear (49). The eccentric is now free to turn.

2. Align the eccentric to the record post.

3. Tighten the set screw. Do not tighten the set screw too tight because it might dent the eccentric tube and cause binding.

Pickup Arm Height

With the changer out of cycle, the needle of the pickup arm should be even with the top of the turntable. If the pickup arm height is not correct, the needle may not rest properly on the record, or may not clear a full stack of records, or the pickup arm may hit the bottom record on the support post:

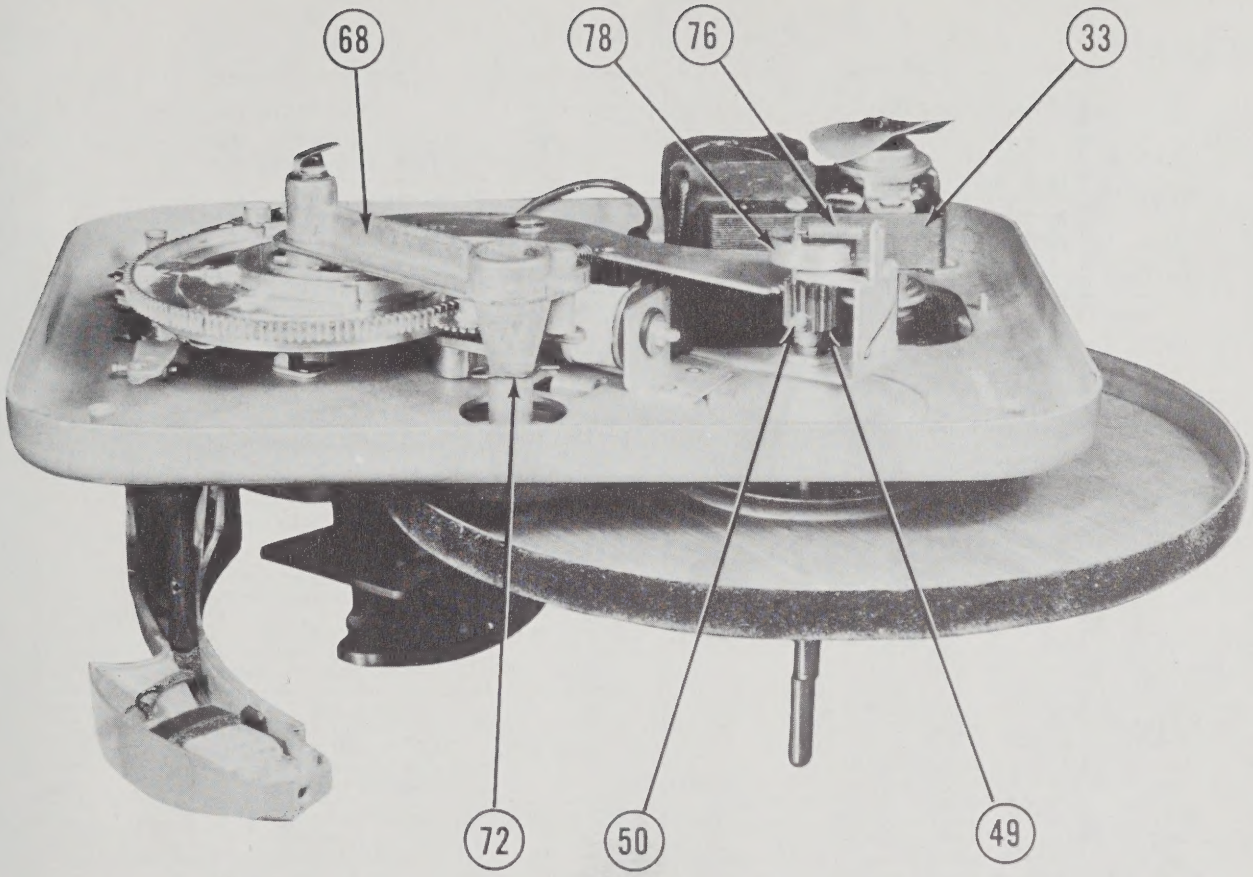
1. Raise the pickup arm straight up.

2. Using long-nose pliers, bend the pickup lift rod (11) (along its flat portion) in the direction required to bring the pickup arm into proper adjustment.

Safety Switch

The safety switch (38), which is wired in series with the solenoid coil (45), is actuated by the incline and straight of the cam surface (63A). Immediately after the change cycle starts, the bottom leaf of the safety switch rides up the incline of track (63A), causing the switch to open the solenoid current circuit. If the contacts are open when not in cycle, the change cycle may fail to start; or excessive "buzzing" will be heard if this switch stays closed too long at the start of the change cycle:

1. With the changer out of cycle, turn the switch adjustment screw (38A) clockwise until the safety switch contacts (38) are open.



BOTTOM FRONT VIEW

2. Move the pickup arm in toward the record post, by hand, until the trip switch (43) is closed.

3. With the trip switch closed, turn the adjustment screw (38A) counterclockwise until the safety switch contacts just close. This will be indicated by the solenoid being energized and starting of change cycle. As a safety factor, turn the adjustment screw counterclockwise an additional ⅜ to ½ turn.

TROUBLES

Mechanism Is Slow in Starting, or Motor Heats Up

1. Check lubrication.
2. Dirt in bearings. Clean with carbon tetrachloride and re-lubricate.
3. Be sure voltage and frequency are correct.
4. Damaged motor.
5. Eccentric stud out of adjustment. Check "Drive Pulley Adjustment."
6. Grease on drive pulley (24), idler wheel (25), and the turntable rim. Clean with carbon tetrachloride.
7. Room temperature abnormally low.

Changer Will Not Cycle

1. Open solenoid coil (18). Replace.
2. Defective wiring.
3. Defective trip switch (43).
4. Safety switch (38) defective or improperly adjusted (see Safety Switch Adjustment).
5. Eccentric stud (53) out of adjustment (see Drive Pulley Adjustment).

Changer Cycles Continuously

1. Eccentric stud (53) out of adjustment (see Drive Pulley Adjustment).
2. Tension spring (74) weak or disconnected. Replace.
3. Trip switch (43) shorted. Repair or replace.
4. Bell crank (52), or drive arm (68), binding on shaft.

Pickup Arm Trips Out of Grooves

1. Record changer not level.
2. Pickup shaft (20) binding in bearing.
3. Selector lever (57A) may be bent out of shape and binding against the detent plate (56).
4. Selector lever (57A) may be binding on the rivet in the detent plate. Correct by spreading the slot in the selector lever.

LUBRICATION

Factory lubrication should be sufficient for a long period of time. However, if it becomes necessary to lubricate the changer, clean all old oil and grease from changer with carbon tetrachloride.

Use Univis P-48 oil (Motorola Part No. 11M2340) on the eccentric and tube assembly (8), and stay-put grease (Motorola Part No. 11M476047) on all other moving parts.

When lubricating, be very careful not to allow oil or grease to come in contact with the rubber surfaces of the drive pulley (24), idler wheel (25), or the turntable rim. If oil or grease gets on any of these surfaces, it should be removed immediately with carbon tetrachloride.

Wipe off all excess lubricant; over lubrication is dangerous.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	45K470538	Pickup arm
	1X470570	Pickup arm (complete: includes crystal cartridge, needle, connecting lead and shaft assembly)
2	42A72314	Retainer clip
3	35A72628	Sponge rubber cushion for pickup arm
4	59A471595	Crystal cartridge, needle included
	47K471596	Life-long phono needle
5	1B470509	Cap and spindle assembly
6	47A74666	Rubber locating pin for cartridge
7	42A75809	Cartridge retainer clip
8	1B470524	Eccentric and tube assembly
9	35A470831	Rubber bumper
10	1X470535	Plate and clamp assembly
11	47A471481	Pickup lift rod
12	4A21941	"C" washer
13	4A21491	9/16 x .315 x .020 thick, brass washer
14	41A471469	Compression spring
15	4A21491	9/16 x .315 x .020 thick brass washer
16	7B471467	Pickup arm and guide bracket
17	47A71685	Pickup arm support pin
18	1X478181	Adjustment bracket (includes screw and nut)
19	3S476110	8-32 x ¾ Phillips R.H.M. screw, cadmium plated
20	47A471471	Pickup shaft
21	4A21941	"C" washer
22	2S1375	8-32 x 11/32 hex. nut, cadmium plated
23	46B470931	Record support post
24	1X71795	Drive pulley and shaft
25		Idler pulley (part of 33)
26		Fiber washer (part of 33)
27		"C" washer (part of 33)
28	59C470590	Turntable
29	3S7342	6-32 x ⅝ slotted binderhead machine screw
30	4S1765	Washer ½ x .147 x 1/64 thick, cadmium
31		Motor mounting grommet
32	43K71249	Spacer bushing
33	59K470458	Motor (including 25, 26, and 27)
34	47B470276	Record and bushing post
35	3S2291	8-32 x 5/16 slotted hex head machine screw
	4S7623	⅜ x 11/64 x .033 thick washer
36	46K70827	Pickup arm rest post (green plastic)
37		Base plate
38	1X478169	Safety switch assembly (complete with screws and mounting bracket)
39	9A470260	Phono output receptacle
40		Screw for mounting record support post
41	45A470455	Trip lever
42	41A71635	Selector spring
43	1X478171	Trip switch assembly (complete with screws and mounting bracket)
44	1X470501	Core and pin assembly
45	24B470265	Solenoid coil
46		Bracket for solenoid
47	7B470266	Spindle bracket
48	2S7004	⅜-32 x 9/16 hex nut, cadmium plate
49	44B71634	Spindle gear
50	3S7109	6-32 x 5/16 slab head set screw
51	5K471663	Insulating grommet
52	1X470285	Bell crank lever assembly
53		Eccentric stud
54	4A21941	"C" washer
55	5K21337	Shoulder rivet .130 x .230
56	1X470480	Selector shaft and plate assembly
57	1X470539	Trip arm and selector lever assembly
57A		Selector lever
57B		Trip arm
58	3S9700	6-32 x 3/16 Allen head set screw
59	3S2697	No. 2 x ⅝ PKZ hex head sheet metal screw
60	41A471681	Tension spring
61	4A470946	Cam shaft washer
62	47B470269	Cam shaft
63	1X471999	Cam wheel and spring assembly
	41A471995	Selector stud guide spring
64	46A470257	Gear arm stud
65	1X470593	Gear arm and bushing assembly
66	4A21491	Washer, 9/16 x .315 x .020 thick
67	4A21941	"C" washer
68	1X470584	Drive arm assembly (complete with bearing and idler gear)
69	4S7597	Washer 7/16 x .171 x .033 thick
70	4S7671	No. 8 split lockwasher
71	3S7374	8-32 x 5/16 screw
72	42A76484	Retainer clip
73		Idler gear (part of 68)
74	41A470592	Tension spring ¼" x 1"
75	4A21941	"C" washer
76	41A14244	Tension spring ⅛" x 23/32"
77	3S9700	6-32 x 3/16 Allen head set screw
78	49A470239	Spindle stop and pin wheel